Karlsruher Institut für Technologie

Module Handbook
Industrial Engineering and Management M.Sc.

SPO 2015

Summer term 2024

Date: 11/04/2024

KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT

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1 General information

Welcome to the new module handbook of your study program! We are delighted that you have decided to study at the KIT Department of Economics and Management and wish you a good start into the new semester! In the following we would like to give you a short introduction to the most important terms and rules that are important in connection with the choice of modules, courses and examinations.

1.1 Structural elements

The program exists of several **subjects** (e.g. business administration, economics, operations research). Every subject is split into **modules** and every module itself consists of one or more interrelated **module component exams**. The extent of every module is indicated by credit points (CP), which will be credited after the successful completion of the module. Some of the modules are **obligatory**. According to the interdisciplinary character of the program, a great variety of **individual specialization and deepening possibilities** exists for a large number of modules. This enables the student to customize content and time schedule of the program according to personal needs, interest and job perspective. The **module handbook** describes the modules belonging to the program. It describes particularly:

- the structure of the modules
- the extent (in CP),
- the dependencies of the modules,
- the learning outcomes,
- the assessment and examinations.

The module handbook serves as a necessary orientation and as a helpful guide throughout the studies. The module handbook does not replace the **course catalog**, which provides important information concerning each semester and variable course details (e.g. time and location of the course).

1.2 Begin and completion of a module

Each module and each examination can only be selected once. The decision on the assignment of an examination to a module (if, for example, an examination in several modules is selectable) is made by the student at the moment when he / she is registered for the appropriate examination. A module is completed or passed when the module examination is passed (grade 4.0 or better). For modules in which the module examination is carried out over several partial examinations, the following applies: The module is completed when all necessary module partial examinations have been passed. In the case of modules which offer alternative partial examinations, the module examination is concluded with the examination with which the required total credit points are reached or exceeded. The module grade, however, is combined with the weight of the predefined credit points for the module in the overall grade calculation.

1.3 Module versions

It is not uncommon for modules to be revised due to, for example, new courses or cancelled examinations. As a rule, a new module version is created, which applies to all students who are new to the module. On the other hand, students who have already started the module enjoy confidence and remain in the old module version. These students can complete the module on the same conditions as at the beginning of the module (exceptions are regulated by the examination committee). The date of the student's "`binding declaration"' on the choice of the module in the sense of §5(2) of the Study and Examination Regulation is decisive. This binding declaration is made by registering for the first examination in this module.

In the module handbook, all modules are presented in their current version. The version number is given in the module description. Older module versions can be accessed via the previous module handbooks in the archive at http://www.wiwi.kit.edu/Archiv_MHB.php.

1.4 General and partial examinations

Module examinations can be either taken in a general examination or in partial examinations. If the module examination is offered as a general examination, the entire learning content of the module will be examined in a single examamination. If the module examination is subdivided into partial examinations, the content of each course will be examined in corresponding partial examinations. Registration for examinations can be done online at the campus management portal. The following functions can be accessed on https://campus.studium.kit.edu/:

- Register/unregister for examinations
- Check for examination results
- Create transcript of records

For further and more detailed information, see https://campus.studium.kit.edu/faq.php.

1.5 Types of examinations

Examinations are split into written examinations, oral examinations and alternative exam assessments ("Prüfungsleistungen anderer Art"). Examinations are always graded. Non exam assessments ("Studienleistungen") can be repeated several times and are not graded.

1.6 Repeating examinations

Principally, a failed written exam, oral exam or alternative exam assessment can repeated only once. If the repeat examination (including an eventually provided verbal repeat examination) will be failed as well, the examination claim is lost. A request for a second repetition has to be made in written form to the examination committee two months after loosing the examination claim. For further information see http://www.wiwi.kit.edu/hinweiseZweitwdh.php.

1.7 Examiners

The examination committee has appointed the KIT examiners and lecturers listed in the module handbook for the modules and their courses as examiners for the courses they offer.

1.8 Additional accomplishments

Additional accomplishments are voluntarily taken exams, which have no impact on the overall grade of the student and can take place on the level of single courses or on entire modules. It is also mandatory to declare an additional accomplishment as such at the time of registration for an exam. Additional accomplishments with at most 30 CP may appear additionally in the certificate.

1.9 Further information

For current information about studying at the KIT Department of Economics and Management, please visit our website www.wiwi.kit.edu as well as Instagram, LinkedIn, and YouTube. Please also see current notices and announcements for students at: https://www.wiwi.kit.edu/studium.php.
Information around the legal and official framework of the study program can be found in the respective study and examination regulations of your study program. These are available under the Official Announcements of KIT (http://www.sle.kit.edu/amtlicheBekanntmachungen.php).

More detailed information about the legal and general conditions of the program can be found in the examination regulation of the program (http://www.sle.kit.edu/amtlicheBekanntmachungen.php).

1.10 Contact

If you have any questions about modules or exams, please contact the examination office of the KIT Department of Economics and Management:

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2 Study plan

The Master's degree program in Industrial Engineering and Management (M.Sc.) has 4 terms and consists of 120 credits (CP) including Master's thesis. The master programme further deepens or complements the scientific qualifications acquired in the bachelor programme. The students should be made capable of independently applying scientific knowledge and methods and evaluate their implications and scope concerning solutions of complex scientific and social problems.

Furthermore, the student has to attend two seminars with a minimum of six CP within the seminar module. In addition to the key skills gained in the seminars (3 CP), the student has to acquire additional key skills totalling at least 3 credits.

<table>
<tr><th>Term</th><th>Credits</th><th>Business Administration</th><th>Economics</th><th>Informatics</th><th>Operations Research</th><th>Engineering</th><th>Electives</th><th>Master Thesis</th></tr>
<tr><td>1</td><td>29</td><td rowspan="2">BUS
9 CP</td><td rowspan="2">ECON
9 CP</td><td rowspan="2">INFO
9 CP</td><td rowspan="2">OR
9 CP</td><td rowspan="2">ENG
9 CP</td><td>Seminar Module
9 CP</td><td rowspan="3"></td></tr>
<tr><td>2</td><td>29</td><td rowspan="2">Elect. Module 1
9 CP</td></tr>
<tr><td>3</td><td>32</td><td>BUS
9 CP</td><td rowspan="2">ENG
9 CP</td><td>Elect. Module 2
9 CP</td></tr>
<tr><td>4</td><td>30</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Master Thesis
30 CP</td></tr>
<tr><td></td><td>120</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Figure 2: Structure of the Master Programme SPO2015 (Recommendation)

Figure 2 shows the structure of the subjects and the credits allocated to the subjects. The student has to choose two elective modules of the following disciplines: Business science, economics, informatics, operations research, engineering science, statistics, law and sociology. In principle, both elective modules are also available in one discipline. Thereby it is it is only allowed to choose either one module in law or in sociology.

It is left to the student's individual curriculum (taking into account the examination and module regulations), in which terms the chosen modules will be started and completed. However, it is highly recommended to complete all courses and seminars before beginning the Master's thesis.

3 Qualification objectives of the Master's program in Industrial Engineering and Management

Graduates of the interdisciplinary Master's program in Industrial Engineering have advanced and in-depth knowledge in business administration, economics, computer science, operations research and engineering. This mainly has its focus on business administration and engineering. The areas of specialization depend on individual interests. Additional knowledge in statistics, law or sociology is also offered depending on one's interests.

They have generalized or specialized expertise in the different disciplines.

The graduates are in a position to define, describe and interpret the specifics, limits, terminologies and doctrines in these subjects, reproduce the current state of research and selectively use this as a basis for further development.

Their extensive know-how enables them to think across the various disciplines and approach issues from different angles.

They are able to select and combine appropriate courses of action for research-related topics. They can then transfer and apply these to specific problems.

They can separately analyze extensive problems such as information and current challenges and review, compare and evaluate these using appropriate methods and concepts.

They evaluate the complexity and risks, identify improvement potentials and choose sustainable solution processes and improvement methods. This puts them in a position where they are able to make responsible and science-based decisions. They are able to come up with innovative ideas and apply them accordingly.

They can oversee these approaches either independently or in teams. They are able to explain and discuss their decisions. They can independently interpret, validate and illustrate the obtained results.

The interdisciplinary use of knowledge also takes account of social, scientific and ethical insights. The graduates can communicate with expert representatives on a scientific level and assume prominent responsibility in a team.

Karlsruhe's industrial engineers are characterized by their interdisciplinary thinking as well as their innovation and management capability. They are particularly qualified for industrial occupations, service sector or in public administration as well as a downstream scientific career (PhD).

4 Key Skills

The master program Industrial Engineering and Management (M.Sc.) at the KIT Department of Economics and Management distinguishes itself by an exceptionally high level of interdisciplinarity. With the combination of business science, economics, informatics, operations research, mathematics as well as engineering and natural science, the integration of knowledge of different disciplines is an inherent element of the programme. As a result, interdisciplinary and connected thinking is encouraged in a natural way. Furthermore, the seminar courses in the master degree programme contribute significantly to the development of key skills by practicing to elaborate and write scientifically sound papers and presentations about special topics. The **integrative** taught key skills, which are acquired throughout the entire programme, can be classified into the following fields:

Soft skills

Team work, social communication and creativity techniques
Presentations and presentation techniques
Logical and systematical arguing and writing
Structured problem solving and communication

Enabling skills

Decision making in business context
Project management competences
Fundamentals of business science
English as a foreign language

Orientational knowledge

Acquisition of interdisciplinary knowledge
Institutional knowledge about economic and legal systems
Knowledge about international organisations
Media, technology and innovation

The integrative acquisition of key skills especially takes place in several obligatory courses during the master programme, namely

- Seminar module
- Mentoring of the Master's thesis
- Business science, economics and informatics modules

Besides the integrated key skills, the additive acquisition of key skills, which are totalling at least three credits within the seminar module, is scheduled. Students may choose freely among the offered courses of HoC, ZAK and Sprachenzenrtum.

5 Field of study structure

Mandatory	
Master's Thesis	30 CR
Business Administration	18 CR
Economics	9 CR
Informatics	9 CR
Operations Research	9 CR
Engineering Sciences	18 CR
Compulsory Elective Modules	27 CR

5.1 Master's Thesis

Credits
30

Mandatory		
M-WIWI-101650	Module Master's Thesis	30 CR

5.2 Business Administration

Credits
18

Business Administration (Election: 2 items)		
M-WIWI-105659	Advanced Machine Learning and Data Science	9 CR
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-105714	Consumer Research	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-103117	Data Science: Data-Driven Information Systems	9 CR
M-WIWI-103118	Data Science: Data-Driven User Modeling	9 CR
M-WIWI-101647	Data Science: Evidence-based Marketing	9 CR
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	9 CR
M-WIWI-105032	Data Science for Finance	9 CR
M-WIWI-104080	Designing Interactive Information Systems	9 CR
M-WIWI-106258	Digital Marketing	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-WIWI-101409	Electronic Markets	9 CR
M-WIWI-101451	Energy Economics and Energy Markets	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101488	Entrepreneurship (EnTechnon)	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research	9 CR
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations	9 CR
M-WIWI-101471	Industrial Production II	9 CR
M-WIWI-101412	Industrial Production III	9 CR
M-WIWI-101411	Information Engineering	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-WIWI-101507	Innovation Management	9 CR
M-WIWI-105312	Marketing and Sales Management	9 CR
M-WIWI-101446	Market Engineering	9 CR
M-WIWI-106660	Modeling the Dynamics of Financial Markets neu	9 CR
M-WIWI-101506	Service Analytics	9 CR
M-WIWI-101503	Service Design Thinking	9 CR
M-WIWI-102754	Service Economics and Management	9 CR
M-WIWI-102806	Service Innovation, Design & Engineering	9 CR
M-WIWI-101448	Service Management	9 CR
M-WIWI-103119	Advanced Topics in Strategy and Management	9 CR
M-WIWI-105010	Student Innovation Lab (SIL) 1	9 CR

5.3 Economics

Credits
9

Economics (Election: 1 item)		
M-WIWI-101497	Agglomeration and Innovation	9 CR
M-WIWI-101453	Applied Strategic Decisions	9 CR
M-WIWI-101504	Collective Decision Making	9 CR
M-WIWI-101505	Experimental Economics	9 CR
M-WIWI-101514	Innovation Economics	9 CR
M-WIWI-101478	Innovation and Growth	9 CR
M-WIWI-101500	Microeconomic Theory	9 CR
M-WIWI-101406	Network Economics	9 CR
M-WIWI-101638	Econometrics and Statistics I	9 CR
M-WIWI-101502	Economic Theory and its Application in Finance	9 CR
M-WIWI-101468	Environmental Economics	9 CR
M-WIWI-101511	Advanced Topics in Public Finance	9 CR
M-WIWI-101485	Transport Infrastructure Policy and Regional Development	9 CR
M-WIWI-101496	Growth and Agglomeration	9 CR

5.4 Informatics

Credits
9

Informatics (Election: 1 item)		
M-WIWI-101472	Informatics	9 CR

5.5 Operations Research

Credits
9

Operations Research (Election: 1 item)		
M-WIWI-101473	Mathematical Programming	9 CR
M-WIWI-102832	Operations Research in Supply Chain Management	9 CR
M-WIWI-102805	Service Operations	9 CR
M-WIWI-103289	Stochastic Optimization	9 CR

5.6 Engineering Sciences

Credits
18

Engineering Sciences (Election: at least 18 credits)		
M-MACH-101298	Automated Manufacturing Systems	9 CR
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-MACH-101290	BioMEMS	9 CR
M-BGU-105592	Digitalization in Facility Management	9 CR
M-MACH-101296	Energy and Process Technology I	9 CR
M-MACH-101297	Energy and Process Technology II	9 CR
M-BGU-100998	Design, Construction, Operation and Maintenance of Highways	9 CR
M-ETIT-101164	Generation and Transmission of Renewable Power	9 CR
M-BGU-106453	Facility Management in Hospitals for Industrial Engineering	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-MACH-101282	Global Production and Logistics	9 CR
M-BGU-101064	Fundamentals of Transportation	9 CR
M-CIWVT-101120	Principles of Food Process Engineering	9 CR
M-ETIT-101163	High-Voltage Technology	9 CR
M-MACH-102626	Major Field: Integrated Product Development	18 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105968	Artificial Intelligence in Production	9 CR
M-BGU-101884	Lean Management in Construction	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-101278	Material Flow in Networked Logistic Systems	9 CR
M-MACH-101291	Microfabrication	9 CR
M-MACH-101292	Microoptics	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-MACH-106496	Modern Mobility on Rails and Roads	9 CR
M-MACH-101294	Nanotechnology	9 CR
M-WIWI-104837	Natural Hazards and Risk Management	9 CR
M-MACH-101295	Optoelectronics and Optical Communication	9 CR
M-MACH-106590	Production Engineering	9 CR
M-BGU-101888	Project Management in Construction	9 CR
M-ETIT-101157	Control Engineering II	9 CR
M-ETIT-101158	Sensor Technology I	9 CR
M-BGU-101066	Safety, Computing and Law in Highway Engineering	9 CR
M-MACH-101268	Specific Topics in Materials Science	9 CR
M-BGU-100999	Highway Engineering	9 CR
M-MACH-105455	Strategic Design of Modern Production Systems	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-BGU-104448	Urban Water Technologies	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-BGU-101110	Process Engineering in Construction	9 CR
M-BGU-101065	Transportation Modelling and Traffic Management	9 CR
M-CIWVT-101119	Specialization in Food Process Engineering	9 CR
M-MACH-104888	Advanced Module Logistics	9 CR
M-MACH-101283	Virtual Engineering A	9 CR

M-MACH-101281	Virtual Engineering B	9 CR
M-CIWVT-101121	Water Chemistry and Water Technology I	9 CR
M-CIWVT-101122	Water Chemistry and Water Technology II	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR

5.7 Compulsory Elective Modules

Credits
27

Election notes
Within the scope of the elective compulsory area, one **seminar module** (independent of subject) is to be taken over two seminars and further key qualification courses and elective modules amounting to 18 Credits. The elective modules can be chosen from Business Administration, Economics, Informatics, Operations Research, Engineering Sciences, Statistics, Law or Sociology. In principle, the elective modules can also be completed in one subject. However, the subjects Law and Sociology may only have one module in total.

Mandatory		
M-WIWI-101808	Seminar Module	9 CR
Business Administration (Election: at most 18 credits)		
M-WIWI-105659	Advanced Machine Learning and Data Science	9 CR
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-105714	Consumer Research	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-103117	Data Science: Data-Driven Information Systems	9 CR
M-WIWI-103118	Data Science: Data-Driven User Modeling	9 CR
M-WIWI-101647	Data Science: Evidence-based Marketing	9 CR
M-WIWI-105661	Data Science: Intelligent, Adaptive, and Learning Information Services	9 CR
M-WIWI-105032	Data Science for Finance	9 CR
M-WIWI-104080	Designing Interactive Information Systems	9 CR
M-WIWI-106258	Digital Marketing	9 CR
M-WIWI-102808	Digital Service Systems in Industry	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-WIWI-101409	Electronic Markets	9 CR
M-WIWI-101451	Energy Economics and Energy Markets	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101488	Entrepreneurship (EnTechnon)	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-105894	Foundations for Advanced Financial -Quant and -Machine Learning Research	9 CR
M-WIWI-105923	Incentives, Interactivity & Decisions in Organizations	9 CR
M-WIWI-101471	Industrial Production II	9 CR
M-WIWI-101412	Industrial Production III	9 CR
M-WIWI-101411	Information Engineering	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-WIWI-101507	Innovation Management	9 CR
M-WIWI-101446	Market Engineering	9 CR
M-WIWI-105312	Marketing and Sales Management	9 CR
M-WIWI-106660	Modeling the Dynamics of Financial Markets neu	9 CR
M-WIWI-101506	Service Analytics	9 CR
M-WIWI-101503	Service Design Thinking	9 CR
M-WIWI-102806	Service Innovation, Design & Engineering	9 CR
M-WIWI-101448	Service Management	9 CR
M-WIWI-102754	Service Economics and Management	9 CR
M-WIWI-103119	Advanced Topics in Strategy and Management	9 CR
M-WIWI-105010	Student Innovation Lab (SIL) 1	9 CR
M-WIWI-105011	Student Innovation Lab (SIL) 2	9 CR
Economics (Election: at most 18 credits)		
M-WIWI-101497	Agglomeration and Innovation	9 CR
M-WIWI-101453	Applied Strategic Decisions	9 CR
M-WIWI-101504	Collective Decision Making	9 CR
M-WIWI-101505	Experimental Economics	9 CR
M-WIWI-101514	Innovation Economics	9 CR
M-WIWI-101478	Innovation and Growth	9 CR
M-WIWI-101500	Microeconomic Theory	9 CR

M-WIWI-101406	Network Economics	9 CR
M-WIWI-101638	Econometrics and Statistics I	9 CR
M-WIWI-101502	Economic Theory and its Application in Finance	9 CR
M-WIWI-101468	Environmental Economics	9 CR
M-WIWI-101485	Transport Infrastructure Policy and Regional Development	9 CR
M-WIWI-101511	Advanced Topics in Public Finance	9 CR
M-WIWI-101496	Growth and Agglomeration	9 CR
Informatics (Election: at most 18 credits)		
M-WIWI-101628	Emphasis in Informatics	9 CR
M-WIWI-101630	Electives in Informatics	9 CR
Operations Research (Election: at most 18 credits)		
M-WIWI-101473	Mathematical Programming	9 CR
M-WIWI-102832	Operations Research in Supply Chain Management	9 CR
M-WIWI-102805	Service Operations	9 CR
M-WIWI-103289	Stochastic Optimization	9 CR
Engineering Sciences (Election: at most 18 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101298	Automated Manufacturing Systems	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-MACH-101290	BioMEMS	9 CR
M-BGU-105592	Digitalization in Facility Management	9 CR
M-MACH-101296	Energy and Process Technology I	9 CR
M-MACH-101297	Energy and Process Technology II	9 CR
M-BGU-100998	Design, Construction, Operation and Maintenance of Highways	9 CR
M-ETIT-101164	Generation and Transmission of Renewable Power	9 CR
M-BGU-106453	Facility Management in Hospitals for Industrial Engineering	9 CR
M-MACH-101264	Handling Characteristics of Motor Vehicles	9 CR
M-MACH-101265	Vehicle Development	9 CR
M-MACH-101266	Automotive Engineering	9 CR
M-MACH-101276	Manufacturing Technology	9 CR
M-MACH-101282	Global Production and Logistics	9 CR
M-BGU-101064	Fundamentals of Transportation	9 CR
M-CIWVT-101120	Principles of Food Process Engineering	9 CR
M-ETIT-101163	High-Voltage Technology	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-102626	Major Field: Integrated Product Development	18 CR
M-MACH-105968	Artificial Intelligence in Production	9 CR
M-BGU-101884	Lean Management in Construction	9 CR
M-MACH-105298	Logistics and Supply Chain Management	9 CR
M-MACH-101278	Material Flow in Networked Logistic Systems	9 CR
M-MACH-101291	Microfabrication	9 CR
M-MACH-101292	Microoptics	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-MACH-106496	Modern Mobility on Rails and Roads	9 CR
M-MACH-101294	Nanotechnology	9 CR
M-WIWI-104837	Natural Hazards and Risk Management	9 CR
M-MACH-101295	Optoelectronics and Optical Communication	9 CR
M-MACH-106590	Production Engineering	9 CR
M-BGU-101888	Project Management in Construction	9 CR

M-ETIT-101157	Control Engineering II	9 CR
M-ETIT-101158	Sensor Technology I	9 CR
M-BGU-101066	Safety, Computing and Law in Highway Engineering	9 CR
M-MACH-101268	Specific Topics in Materials Science	9 CR
M-BGU-100999	Highway Engineering	9 CR
M-MACH-105455	Strategic Design of Modern Production Systems	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-BGU-104448	Urban Water Technologies	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-BGU-101110	Process Engineering in Construction	9 CR
M-BGU-101065	Transportation Modelling and Traffic Management	9 CR
M-CIWVT-101119	Specialization in Food Process Engineering	9 CR
M-MACH-104888	Advanced Module Logistics	9 CR
M-MACH-101283	Virtual Engineering A	9 CR
M-MACH-101281	Virtual Engineering B	9 CR
M-CIWVT-101121	Water Chemistry and Water Technology I	9 CR
M-CIWVT-101122	Water Chemistry and Water Technology II	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Statistics (Election: at most 18 credits)		
M-WIWI-101637	Analytics and Statistics	9 CR
M-WIWI-101638	Econometrics and Statistics I	9 CR
M-WIWI-101639	Econometrics and Statistics II	9 CR
Law or Sociology (Election: at most 9 credits)		
M-INFO-101217	Public Business Law	9 CR
M-INFO-101215	Intellectual Property Law	9 CR
M-INFO-101216	Private Business Law	9 CR
M-GEISTSOZ-101169	Sociology	9 CR
M-INFO-101191	Commercial Law	9 CR

6 Modules

M 6.1 Module: Advanced Machine Learning and Data Science [M-WIWI-105659]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	English	4	1

Mandatory			
T-WIWI-111305	Advanced Machine Learning and Data Science	9 CR	Ulrich

Competence Certificate
Due to the professor's research sabbatical, the BSc module "Financial Data Science" and MSc module "Foundations for Advanced Financial -Quant and -Machine Learning Research" and the MSc module "Advanced Machine Learning and Data Science" along with the respective examinations will not be offered in SS2023. Bachelor and Master thesis projects are not affected and will be supervised.

The assessment is carried out in an alternative form.The final grade is evaluated based on the intermediate presentations during the project, the quality of the implementation, the final written thesis and a final presentation.

Prerequisites
see T-WIWI-106193 "Advanced Machine Learning and Data Science".

Competence Goal
After a successful project, the students can:

- select and apply modern machine learning methods to solve a data science problem;
- organize themselves in a team in a goal-oriented manner and bring an extensive software project in the field of data science and machine learning to success;
- deepen their data science and machine learning skills
- solve a finance problem with the help of data science and machine learning algorithm.

Content
The course is targeted at students with a major in Data Science and/or Machine Learning and/or Quantitative Finance. It offers students the opportunity to develop hands-on knowledge on new developments in the intersection of quantitative financial markets, data science and machine learning. The result of the project should not only be a final thesis, but the implementation of methods or development of an algorithm in machine learning and data science. Typically, problems and data are taken from current research and innovations in the field of quantitative asset and risk management.

Workload
Total effort for 9 credit points: approx. 270 hours are divided into the following parts: Communication:Exchange during the project: 30 h, Final presentation: 10 h; Implementation and thesis: Preparation before development (Problem analysis and solution design): 70 h, Solution implementation: 110 h, Tests and quality assurance: 50 h.

Recommendation
None

M 6.2 Module: Advanced Module Logistics [M-MACH-104888]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	7

Specialization module logistics (Election:)			
T-MACH-105230	Decentrally Controlled Intralogistic Systems	4 CR	Furmans
T-MACH-112113	Dynamic Systems of Technical Logistics	6 CR	Mittwollen
T-MACH-112114	Dynamic Systems of Technical Logistics - Project	4 CR	Mittwollen
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Kramer, Schönung
T-MACH-111003	Global Logistics	4 CR	Furmans
T-MACH-102128	Information Systems and Supply Chain Management	3 CR	Kilger
T-MACH-105187	IT-Fundamentals of Logistics	4 CR	Thomas
T-MACH-105174	Warehousing and Distribution Systems	3 CR	Furmans
T-MACH-105175	Airport Logistics	3 CR	Richter
T-MACH-105171	Safety Engineering	4 CR	Kany
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Spieckermann
T-MACH-112213	Applied material flow simulation	4,5 CR	Baumann

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of 9 credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
One of the modules M-MACH-101279, M-MACH-101277, M-MACH-101280 or M-MACH-105298 must be completed.

Competence Goal
The student aquires

- well-founded knowledge and method knowledge in the main topics of logistics,
- ability for modeling logistic systems with adequate accuracy by using simple models,
- ability to evaluate logistic systems and to identify cause-and-effects-chains within logistic systems.

Content
The Advanced Module Logistics provides a comprehensive and well-founded basics for the main topics of logistics. The module allows students to focus on various topics within the field of logistics.

Workload
270 hours

Learning type
Lecture, tutorial.

M 6.3 Module: Advanced Topics in Public Finance [M-WIWI-101511]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	7

Electives (Election: between 1 and 2 items)			
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102740	Public Management	4,5 CR	Wigger
Supplementary Courses (Election: between 0 and 1 items)			
T-WIWI-111304	Fundamentals of National and International Group Taxation	4,5 CR	Wigger
T-WIWI-102739	Public Revenues	4,5 CR	Wigger

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Public Management" or "Basics of German Company Tax Law and Tax Planning" is mandatory in the module and must be successfully examined.

Competence Goal
The student

- understands the theory and politics of taxation
- has knowledge in the area of public debt.
- understands efficiency problems of public organizations.
- is able to work on fiscal problems.

Content
As a branch of Economics, Public Finance is concerned with the theory and policy of the public sector and its interrelations with the private sector. It analyzes the economic role of the state from a normative as well as from a positive point of view. The normative view examines efficiency- and equity-oriented motives for government intervention and develops fiscal policy guidelines. The positive view explains the actual behavior of economic agents in public sector affairs.

In the course of the lectures within this module the students achieve knowledge in the areas of public revenues, national and international law of taxation and theory of public sector organizations.

Annotation
The course T-WIWI-102790 "Specific Aspects in Taxation" will no longer be offered in the module as of winter semester 2018/2019.

Students who successfully passed the exam in „Public Management“ before the introduction of the module “Advanced Topics in Public Finance” in winter term 2014/15 are allowed to take both courses “Public Revenues” and “Specific Aspects in Taxation".

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Basic knowledge in the area of public finance and public management is required.

M 6.4 Module: Advanced Topics in Strategy and Management [M-WIWI-103119]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	1

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-106188	Workshop Current Topics in Strategy and Management	3 CR	Lindstädt
T-WIWI-106189	Workshop Business Wargaming – Analyzing Strategic Interactions	3 CR	Lindstädt
T-WIWI-106190	Strategy and Management Theory: Developments and "Classics"	3 CR	Lindstädt

Competence Certificate
The control of success takes place in the form of partial examinations (according to §4(2), 1-3 SPO) on the courses of the module, amounting to a total of 9 LP. The performance review is described for each course of this module. The overall grade of the module is formed from the LP-weighted grades of the partial examinations and truncated after the first decimal place.

Prerequisites
None

Competence Goal
Upon completion of the module, students will be able to,

- independently analyze strategic issues in a structured manner using appropriate models and frames of reference from management theory and derive recommendations.
- Convincingly present their position by means of a well thought-out argumentation in structured discussions.
- independently deal with a current, research-oriented issue from strategic management.
- draw his/her own conclusions from the little structured information by incorporating his/her interdisciplinary knowledge and selectively develop the current research results.
- apply and discuss theoretical contents of management theory to real situations by intensively dealing with a variety of practice-relevant case studies.

Content
In terms of content, three focal points will be set. First, strategic issues are discussed and analyzed on the basis of jointly selected case studies. Secondly, the students deal intensively with the topic of business wargaming in a workshop and analyze strategic interactions. Thirdly, topics of strategy and management theory will be elaborated in a written paper.

Annotation
The module is admission restricted. Upon successful admission to a course, the student is guaranteed the opportunity to complete the module. Examinations are offered at least every other semester so that the entire module can be completed in two semesters.

Workload
Total effort for 9 credit points: approx. 270 hours. The exact distribution is done according to the credit points of the courses of the module. The workload for courses with 3 credits is approx. 90h.

M 6.5 Module: Agglomeration and Innovation [M-WIWI-101497]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	3

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-112822	Economics of Innovation	4,5 CR	Ott
T-WIWI-103107	Spatial Economics	4,5 CR	Ott

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must add up to at least 9.

The overall grade for the module is the average of the grades for each course weighted by the credits.

Prerequisites
Successful completion of the courses *Economics I: Microeconomics* and *Economics II: Macroeconomics* is required.

Competence Goal
The student

- applies quantitative methods in the context of economic models
- learns advanced micro- and macroeconomic theories
- is able to derive policy recommendations based on theory
- can identify the importance of alternative incentive mechanisms for the development and spread of innovations
- begins to understand the connections between market form and the development of innovations
- analyzes the determinants of the spatial distribution of economic activity
- understands how processes of concentration result from the interplay of agglomeration and dispersion forces

Content
The module comprises theories of incentives for the development of innovations as well as theories of wage-based labor mobility, which leads to spatial concentration processes. The microfounded optimality decisions of the actors are in each case transformed into macroeconomic results. In the context of the theory of innovations the diffusion of technological knowledge and the resulting effect on growth due to technological progress is discussed and economic-policy implications are derived. Spatial economics adds to the picture of economic activity by introducing a spatial point of view.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.6 Module: Analytics and Statistics [M-WIWI-101637]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (Statistics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	4

Compulsory Elective Courses (Election:)			
T-WIWI-106341	Machine Learning 2 – Advanced Methods	4,5 CR	Zöllner
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CR	Grothe
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-103123	Advanced Statistics	4,5 CR	Grothe
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
A Student

- Deepens the knowledge of descriptive and inferential statistics.
- Deals with simulation methods.
- Learns basic and advanced methods of statistical analysis of multivariate and high-dimensional data.

Content

- Deriving estimates and testing hypotheses
- Stochastic processes
- Multivariate statistics, copulas
- Dependence measures
- Dimension reduction
- High-dimensional methods
- Prediction

Annotation
The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this module is approximately 270 hours.

M 6.7 Module: Applied Strategic Decisions [M-WIWI-101453]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	6

Mandatory			
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
Supplementary Courses (Election: between 4,5 and 5 credits)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CR	Ruckes
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CR	Weinhardt
T-WIWI-102862	Predictive Mechanism and Market Design	4,5 CR	Reiß
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course "Advanced Game Theory" is obligatory. Exception: The course "Introduction to Game Theory" was completed. Even those who have already successfully proven "Advanced Game Theory" in another master module can take the module. In this case you can choose freely from the rest of the offer. However, this choice can only be made by the examination office of the Department of Economics and Management.

Competence Goal
Students

- can model and analyze complex situations of strategic interaction using advanced game theoretic concepts;
- are provided with essential and advanced game theoretic solution concepts on a rigorous level and can apply them to understand real-life problems;
- learn about the experimental method, ranging from designing an economic experiment to data analysis.

Content
The module provides solid skills in game theory and offers a broad range of game theoretic applications. To improve the understanding of theoretical concepts, it pays attention to empirical evidence as well.

Annotation
The course *Predictive Mechanism and Market Design* is not offered each year.

Workload
The total workload for this module is approximately 270 hours. The exact distribution is made according to the credit points of the courses of the module.

Recommendation
Basic knowledge in game theory is assumed.

M 6.8 Module: Artificial Intelligence in Production [M-MACH-105968]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	1

Mandatory			
T-MACH-112115	Artificial Intelligence in Production	5 CR	Fleischer
T-MACH-112121	Seminar Application of Artificial Intelligence in Production	4 CR	Fleischer

Competence Certificate
T-MACH-112115 - Written Exam (90 min)

T-MACH-112121 - Alternative test achievement (graded)

Competence Goal
The Students understand

- the relevance for the application of artificial intelligence in production and know the main drivers and challenges.
- the CRISP-DM process for implementing AI projects in production.
- the most important methods within the CRISP-DM phases and can theoretically select and practically apply them holistically based on practical issues.

Content
The module AI in Production is designed to teach students the practical, holistic integration of machine learning methods in production. The course is oriented towards the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content-related aspects (methods) within the individual phases. In addition to teaching the practical aspects of integrating the most important machine learning methods, the focus is primarily on the necessary steps for data generation and data preparation as well as the implementation and validation of the methods in an industrial environment. The focus of the module is on the practical teaching of the contents, based on production engineering issues. The necessary theoretical basics are taught in the course "Lecture AI in Production". In the course "Project internship Application of AI in Production", practice-relevant architectures of machine learning are used to solve current practical problems in the production environment. The implementation here is also oriented to the phases of the CRISP-DM.

Workload
Artificial Intelligence in Production
MACH:
regular attendance: 31,5 hours
self-study: 88,5 hours
WING:
regular attendance: 31,5 hours
self-study: 118,5 hours

Seminar Application of Artificial Intelligence in Production
regular attendance: 21 hours
self-study: 99 hours

Learning type
Lecture, Seminar

M 6.9 Module: Automated Manufacturing Systems [M-MACH-101298]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-MACH-102162	Automated Manufacturing Systems	9 CR	Fleischer

Competence Certificate
written exam (120 minutes)

Prerequisites
none

Competence Goal
The students

- are able to analyze implemented automated manufacturing systems and describe their components.
- are capable to assess the implemented examples of implemented automated manufacturing systems and apply them to new problems.
- are able to name automation tasks in manufacturing plants and name the components which are necessary for the implementation of each automation task.
- are capable with respect to a given task to plan the configuration of an automated manufacturing system and to determine the necessary components to its realization.
- are able to design and select components for a given use case of the categories: "Handling Technology", "Industrial Robotics", "Sensory" and "Controls".
- are capable to compare different concepts for multi-machine systems and select a suitable concept for a given use case.

Content
The module gives an overview of the structure and functioning of automated production plants. In a basic chapter, fundamental elements for the realisation of automated production systems are taught. These include:

- Drive and control technology
- Handling technology for handling workpieces and tools
- Industrial robot technology
- Quality assurance in automated production plants
- Automated machines, cells, centres and systems for production and assembly
- Structures of multi-machine systems
- Project planning of automated production plants

An interdisciplinary view of these sub-areas results in interfaces to Industry 4.0 approaches. The basic chapters are supplemented by practical application examples and live demonstrations in the Karlsruhe Forschungsfabrik.

In the second part of the module, the fundamentals taught will be clarified using practically executed production processes for manufacturing and disassembling components, and the automated production facilities for manufacturing these components will be analyzed. In the field of automotive powertrain technology, the automated production process for both the manufacture and disassembly of batteries is considered. In the powertrain area, automated production facilities for the disassembly of electric motors are considered. Furthermore, automated production systems for the field of additive manufacturing are considered.

Within tutorials, the contents from the module are deepened and applied to concrete problems and tasks.

Workload
regular attendance: 63 hours
self-study: 207 hours

Learning type
Lectures, exercise, excursion

M 6.10 Module: Automotive Engineering [M-MACH-101266]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	6

Automotive Engineering (Election: at least 9 credits)			
T-MACH-102203	Automotive Engineering I	6 CR	Gauterin, Gießler
T-MACH-112126	Data-Driven Algorithms in Vehicle Technology	4 CR	Scheubner
T-MACH-102093	Fluid Power Systems	5 CR	Geimer
T-MACH-100092	Automotive Engineering I	6 CR	Gauterin, Gießler
T-MACH-102117	Automotive Engineering II	3 CR	Gauterin, Gießler
T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I	1,5 CR	Bardehle
T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II	1,5 CR	Bardehle
T-MACH-110796	Python Algorithm for Vehicle Technology	4 CR	Rhode
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gauterin, Gießler
T-MACH-111820	Control of Mobile Machines – Prerequisites	0 CR	Becker, Geimer
T-MACH-111821	Control of Mobile Machines	4 CR	Becker, Geimer

Competence Certificate
The assessment is carried out as partial exams.

The partial exams consists of a written exam (90 to 120 minutes) or an oral exam (duration 30 to 40 minutes).

Prerequisites
None

Competence Goal
The student

- knows the most important components of a vehicle,
- knows and understands the functioning and the interaction of the individual components,
- knows the basics of dimensioning the components.

Content
In the module Automotive Engineering the basics are taught, which are important for the development, the design, the production and the operation of vehicles. Particularly the primary important aggregates like engine, gear, drive train, chasis and auxiliary equipment are explained, but also all technical equipment, which make the operation safer and easier. Additionally the interior equipment is examined, which shall provide a preferably comfortable, optimum ambience to the user.

In the module Automotive Engineering the focus is on passenger cars and commercial vehicles, which are designed for road applications.

Workload
The total work load for this module is about 270 Hours (9 Credits). The partition of the work load is carried out according to the credit points of the courses of the module. The work load for courses with 6 credit points is about 180 hours, for courses with 4.5 credit points about 135 hours, for courses with 3 credit points about 90 hours, and for courses with 1.5 credit points about 45 hours. The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam duration and the time that is required to achieve the objectives of the module as an average student with an average performance.

Recommendation
Knowledge of the content of the courses *Engineering Mechanics I* [2161238] and *Engineering Mechanics II* [1262276] is helpful.

Learning type
The teaching and learning procedures (lecture, lab course, workshop) are described for each course of the module separately.

M 6.11 Module: BioMEMS [M-MACH-101290]

Responsible: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	3

Mandatory			
T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	3 CR	Guber
BioMEMS (Election: at least 6 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-102165	Selected Topics on Optics and Microoptics for Mechanical Engineers	3 CR	Heckele, Mappes
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CR	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CR	Guber
T-MACH-101910	Microactuators	3 CR	Kohl
T-MACH-102176	Current Topics on BioMEMS	4 CR	Guber
T-MACH-111807	Introduction to Bionics	3 CR	Hölscher
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	4 CR	Last

Competence Certificate
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- has basic as well as extensive knowledge about different fields of applications of BioMEMS
- understands continuative aspects of the related subjects optics and microoptics, micro actuators, replications techniques and bionics

Content
Operations through small orifices, a pill which will take pictures on its way through your body or lab results right at the point of care - the need for easier and faster ways to help people is an important factor in research. The module BioMEMS (Bio(medical)-Micro-Electro-Mechanical-Systems) describes the application of microtechnology in the field of Life-Science, medical applications and Biotechnology and will teach you the necessary skills to understand and develop biological and medical devices.

The BioMEMS lectures will cover the fields of minimal invasive surgery, lab-on-chip systems, NOTES-Technology (Natural Orifice Transluminal Endoscopic Surgery), as well as endoscopic surgery and stent technology.

Additionally to the BioMEMS lectures you can specialize in various related fields like fabrication, actuation, optics and bionics. The course Replication processes will teach you some cost efficient and fast ways to produce parts for medical or biological devices. In the course Microactuation it is discussed how to receive movements in micrometer scale in a microsystem, this could be e.g. to drive micro pumps or micro valves. The necessary tools for optical measurement and methods of analysis to gain high resolution pictures are also part of this module. To deepen your knowledge and to get a hands-on experience this module contains a one week lab course. In the lecture bionics you can see how biological effects can be transferred into technical products.

Workload
270 hours

Learning type
Lectures

M 6.12 Module: Business & Service Engineering [M-WIWI-101410]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	8

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-113160	Digital Democracy	4,5 CR	Fegert
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CR	Satzger
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student should

- learn to develop and implement new markets with regards to the technological progresses of information and communication technology and the increasing economic networking
- learn to restructure and develop new business processes in markets under those conditions
- understand service competition as a sustainable competitive strategy and understand the effects of service competition on the design of markets, products, processes and services.
- improve his statistics skills and apply them to appropriate cases
- learn to elaborate solutions in a team

Content
This module addresses the challenges of creating new kinds of products, processes, services, and markets from a service perspective in the context of new developed information and communication technologies and the globalization process. The module describes service competition as a business strategy in the long term that leads to the design of business processes, business models, forms of organization, markets, and competition. This will be shown by actual examples from personalized services, recommender services and social networks.

Annotation
All practical Seminars offered at the IM can be chosen for *Special Topics in Information Systems*. Please update yourself on www.iism.kit.edu/im/lehre .

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.13 Module: Collective Decision Making [M-WIWI-101504]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	English	4	4

Compulsory Elective Courses (Election:)			
T-WIWI-102740	Public Management	4,5 CR	Wigger
T-WIWI-102859	Social Choice Theory	4,5 CR	Puppe

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- are able to model and assess problems in public economics and to analyze them with respect to positive and normative aspects,
- understand individual incentives and social outcomes of different institutional designs,
- are familiar with the functioning and design of democratic elections and can analyze them with respect to their individual incentives.

Content
The focus of the module is on mechanisms for public decision making including voting and the aggregation of preferences and judgements.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.14 Module: Combustion Engines I [M-MACH-101275]

Responsible: Prof. Dr. Thomas Koch
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each winter term	1 term	4	5

Wahlpflicht (Election: between 1 and 2 items)			
T-MACH-111550	CO2-Neutral Combustion Engines and their Fuels I	5 CR	Koch
T-MACH-111585	Hydrogen and reFuels - Energy Conversion in Combustion Engines	4 CR	Kubach

Competence Certificate
The module examination contains of two oral examinations. The module score results from the two scores weighted according to the ECTS.

Prerequisites
None

Competence Goal
The student can name and explain the working princile of combustion engines. He is able to analyse and evaluate the combustion process. He is able to evaluate influences of gas exchange, mixture formation, fuels and exhaust gas aftertreatment on the combustion performance. He can solve basic research problems in the field of engine development.

The student can name all important influences on the combustion process. He can analyse and evaluate the engine process considering efficiency, emissions and potential.

Content
Working Principle og ICE

Characteristic Parameters

Characteristic parameters

Engine parts

Crank drive

Fuels

Gasolien engine operation modes

Diesel engine operation modes

Emissions

Fundamentals of ICE combustion

Thermodynamics of ICE

Flow field

Wall heat losses

Combsution in Gasoline and Diesel engines

Heat release calculation

Waste heat recovery

CO2-free engine technology

Workload
regular attendance: 62 hours
self-study: 208 hours

M 6.15 Module: Combustion Engines II [M-MACH-101303]

Responsible: Dr.-Ing. Heiko Kubach
Julia Reichel

Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	4

Mandatory			
T-MACH-111560	CO2-Neutral Combustion Engines and their Fuels II	5 CR	Koch
Verbrennungsmotoren II (Election: at least 4 credits)			
T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	4 CR	Gohl
T-MACH-105649	Boosting of Combustion Engines	4 CR	Kech, Kubach
T-MACH-105184	Fuels and Lubricants for Combustion Engines	4 CR	Kehrwald, Kubach
T-MACH-110817	Development of Hybrid Drivetrains	4 CR	Koch
T-MACH-110816	Large Diesel and Gas Engines for Ship Propulsions	4 CR	Kubach
T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment	4 CR	Deutschmann, Grunwaldt, Kubach, Lox
T-MACH-105167	Analysis Tools for Combustion Diagnostics	4 CR	Pfeil
T-MACH-105169	Engine Measurement Techniques	4 CR	Bernhardt
T-MACH-111578	Sustainable Vehicle Drivetrains	4 CR	Koch, Toedter
T-MACH-105985	Ignition Systems	4 CR	Toedter

Competence Certificate
The assessment consists of an oral exam (60 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Prerequisites
It is only possible to choose this module in combination with the module *Combustion Engines I*. The module is passed only after the final partial exam of *Combustion Engines I* is additionally passed.

The course *Combustion Engines II* [2134131] has to be attended.

Competence Goal
See courses.

Content
Compulsory:

Supercharging and air management

Engine mapsEmissions and Exhaust gas aftertreatment

Transient engine operationECU application

Electrification and alternative powertrains

Elective:

Fuels and lubricants for ICE

Fundamentals of catalytic EGA

Analysis tools for combustion diagnostics

Engine measurement techniques

Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines

Workload
regular attendance: 62 h
self-study: 208 h

Learning type
Lecture, Tutorial

M 6.16 Module: Commercial Law [M-INFO-101191]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	3 terms	German	4	3

Mandatory			
T-INFO-102013	Exercises in Civil Law	9 CR	Matz

M 6.17 Module: Consumer Research [M-WIWI-105714]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	5

Compulsory Elective Courses (Election:)			
T-WIWI-113471	Bayesian Statistics for Analyzing Data	4,5 CR	Scheibehenne
T-WIWI-113095	Behavioral Lab Exercise	4,5 CR	Nieken, Scheibehenne
T-WIWI-111100	Current Directions in Consumer Psychology	4,5 CR	Scheibehenne
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-107720	Market Research	4,5 CR	Klarmann

Competence Certificate
The assessment is based on partial exams within the classes offered in this module. Please check the descriptions of the classes for details.

The overall grade of the module is the arithmetic mean of the grades for each course weighted by the number of credits and truncated after the first decimal.

Prerequisites
Willingness to actively engage with the topic.

Competence Goal

- Understand human judgment and decision making in an economic context
- Learn how to plan, program, conduct, statistically analyze, visualize, model, and report behavioral experiments
- Critically evaluate scientific findings in the aftermath of the replication crisis

Content
This module provides students with in-depth knowledge about consumer research at the intersection between Marketing, Psychology, and Cognitive Science. The module consists of classes that look into how individuals and groups make judgments and decisions and what factors influences their behavior (e.g. the lecture on judgment and decision making). Because most findings in this area of research rely on behavioral experiments, this module also focuses on methodological skills. This includes classes on how to plan and design behavioral experiments, conduct and report meaningful statistical analyses, and develop computational cognitive models. The module also includes classes about reproducibility and transparency in the behavioral sciences. The module is a pre-requisite for writing a Master thesis at the KIT Cognition and Consumer Behavior lab.

Workload
The total workload for this module is approximately 270 hours.

Recommendation
Interest in behavioral research.

M 6.18 Module: Control Engineering II [M-ETIT-101157]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Dr.-Ing. Mathias Kluwe

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	2 terms	4	3

Mandatory			
T-ETIT-100666	Control of Linear Multivariable Systems	6 CR	Kluwe
T-ETIT-100980	Nonlinear Control Systems	3 CR	Kluwe

Competence Certificate
The assessment is carried out as partial written exams of the single courses of this module (T-ETIT-100980 and T-ETIT-100666).

Prerequisites
none

Module grade calculation
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Recommendation
For this module a basic knowledge in system theory and control engineering is assumed. These subjects can be found in the course *System Dynamics and Control Engineering* (M-ETIT-102181) which is recommended to have been attended beforehand.

M 6.19 Module: Cross-Functional Management Accounting [M-WIWI-101510]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	11

Mandatory			
T-WIWI-102885	Advanced Management Accounting	4,5 CR	Wouters
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-102835	Marketing Strategy Business Game	1,5 CR	Klarmann
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	3 CR	Klarmann
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-108651	Extraordinary Additional Course in the Module Cross-Functional Management Accounting	4,5 CR	Wouters

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course "Advanced Management Accounting" is compulsory.

The additional courses can only be chosen after the compulsory course has been completed successfully.

Competence Goal
Students will be able to apply advanced management accounting methods to managerial decision-making problems in marketing, finance, organization and strategy.

Content
The module includes a course on several advanced management accounting methods that can be used for various decisions in operations and innovation management. By selecting another course, each student looks in more detail at one interface between management accounting a particular field in management, namely marketing, finance, or organization and strategy.

Annotation
The module "Cross-functional Management Accounting" always includes the compulsory course “Advanced Management Accounting.” Students look at the interface between management accounting and another field in management. Students build the module by adding a course from the specified list. Students can also suggest another suitable course for this module for evaluation by the coordinator.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.20 Module: Data Science for Finance [M-WIWI-105032]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	English	4	1

Mandatory			
T-WIWI-102878	Computational Risk and Asset Management	4,5 CR	Ulrich
T-WIWI-110213	Python for Computational Risk and Asset Management	4,5 CR	Ulrich

Competence Certificate
The module examination takes the form of an alternative exam assessment.
The alternative exam assessment consists of a Python-based "Takehome Exam". At the end of the third week of January, the student is given a "Takehome Exam" which he processes and sends back independently within 4 hours using Python. Precise instructions will be announced at the beginning of the course. The alternative exam assessment can be repeated a maximum of once. A timely repeat option takes place at the end of the third week in March of the same year. More detailed instructions will be given at the beginning of the course.

Competence Goal
The aim of the module is to use data science, machine learning and financial market theories to generate better investment, risk and asset management decisions. The student gets to know the characteristics of different asset classes in an application-oriented manner using real financial market data. We use Python and web scraping techniques to extract, visualize and examine patterns of publicly available financial market data. Interesting and non-public financial market data such as (option and futures data on shares and interest) are provided. Financial market theories are also discussed to improve data analysis through theoretical knowledge. Students get to know stock, interest rate, futures and options markets through the "data science glasses". Through "finance theory glasses" students understand how patterns can be communicated and interpreted using finance theory. Python is the link through which we bring data science and modern financial market modeling together.

Content
The course covers several topics, among them:

- Pattern detection in price and return data in equity, interest rate, futures and option markets
- Quantitative Portfolio Strategies
- Modeling Return Densities using tools from financial econometrics, data science and machine learning
- Valuation of equity, fixed-income, futures and options in a coherent framework to possibly exploit arbitrage opportunities
- Neural networks and Natural Language Processing

Workload
The total workload for this module is 270 hours (9 credit points).The total number of hours resulting from income from studying online video, answering quizzes, studying Ipython notebooks, active and interactive "Python Data Sessions" and reading literature you have heard.

Recommendation
Basic knowledge of capital markt theory.

M 6.21 Module: Data Science: Data-Driven Information Systems [M-WIWI-103117]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	9

Compulsory Elective Courses (Election:)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-106187	Business Data Strategy	4,5 CR	Weinhardt
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche
T-WIWI-113160	Digital Democracy	4,5 CR	Fegert
T-WIWI-110918	Introduction to Bayesian Statistics for Analyzing Data	4,5 CR	Scheibehenne
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CR	Mädche
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CR	Weinhardt
T-WIWI-106207	Practical Seminar: Data-Driven Information Systems	4,5 CR	Satzger, Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

Prerequisites
None.

Competence Goal
The student

- understands the strategic role of integrating, transforming, and analyzing large and complex enterprise data in modern business information systems and is capable of comparing and assessing strategic alternatives
- has the core skills to design, model, and control complex, inter-organisational analytical, processes, including various business functions as well as customers and markets
- understands the usage of performance indicators for a variety of controlling and management issues and is able to define models for generating the relevant performance indicators under considerations of data availability
- distinguishes different analytics methods and concepts and learn when to apply to better understand and anticipate business relationships and developments of industrial and in particular service companies to derive fact- and data- founded managerial actions and strategies.
- knows how to capture uncertainty in the data and how to appropriately consider and visualize uncertainty in decision support or business intelligence systems and analytical processes as a whole.

Content
The amount of business-related data availabe in modern enterprise information systems grows exponentially, and the various data sources are more and more integrated, transformed, and analyzed jointly to gain valuable business insights, pro-actively control and manage business processes, to leverage planning and decision making, and to provide appropriate, potentially novel services to customers based on relationships and developments observed in the data.

Also, data sources are more and more connected and single business unit that used to operate on separate data pools are now becoming highly integrated, providing tremendeous business opportunities but also challenges regarding how the data should be represented, integrated, preprocessed, transformed, and finally used in analytics planning and decision processes.

The courses of this module equip the students with core skills to understands the strategic role of integrating, transforming, and analyzing large and complex enterprise data in modern business information systems. Students will be capable to designing, comparing, and evaluating strategic alternatives. Also, students will learn how to design, model, and control complex analytical processes, including various business functions of industrial and service companies including customers and markets. Students learn core skills to understand fundamental strategies for integrating analytic models and operative controlling mechanisms while ensuring the technical feasibility of the resulting information systems..

Furthermore, the student can distinguish different methods and concepts in the realm of data science and learns when to apply. She/he will know the means of characterizing and analyzing hetergeneous, high-dimensional data available data in data warehouses and external data sources to gain additional insights valuable for enterprise planning and decision making. Also, the students know how to capture uncertainty in the data and how to appropriately consider and visualize uncertainty in business information and business intelligence systems.

The module offers the opportunity to apply and deepen this knowledge in a seminar and hands-on tutorials that are offered with all lectures.

Texteintrag

Recommendation
The module requires a basic understanding of the tasks, systems and processes in business informatics. It is therefore recommended that students attend the course Fundamentals of Information Systems [2540450] beforehand. Furthermore, basic knowledge of operations research as well as descriptive and inferential statistics is required.

M 6.22 Module: Data Science: Data-Driven User Modeling [M-WIWI-103118]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	7

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-113160	Digital Democracy	4,5 CR	Fegert
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CR	Weinhardt
T-WIWI-108765	Practical Seminar: Advanced Analytics	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

Prerequisites
None

Competence Goal
Students of this module

- learn methods for planning empirical studies, in particular laboratory experiments,
- acquire theoretical knowledge and practical skills in analysing empirical data,
- familiarize with different ways of modelling user behaviour, are able to critically discuss, and to evaluate them

Content
Understanding and supporting user interactions with applications better plays an increasingly large role in the design of business applications. This applies both to interfaces for customers and to internal information systems. The data that is generated during user interactions can be channelled straight into business processes, for instance by analysing and decomposing purchase decisions, and by feeding this data into product design processes.

The Crowd Analytics section considers the analysis of data from online platforms, particularly of those following crowd- or peer-to-peer based business models. This includes platforms like Airbnb, Kickstarter and Amazon Mechanical Turk.

Theoretical models of user (decision) behaviour help analyzing the empirically observed user behaviour in a systematic fashion. Testing these models and their predictions in controlled experiments (primarily in the lab) in turn helps refine theory and to generate practically relevant design recommendations. Analyses are carried out using advanced analytic methods.

Students learn fundamental theoretical models for user behaviour in systems and apply them to cases. Students are also taught methods and skills for conceptualizing and planning empirical studies and for analyzing the resulting data.

Recommendation
Basic knowledge of Information Management, Operations Research, Descriptive Statistics, and Inferential Statistics is assumed.

M 6.23 Module: Data Science: Evidence-based Marketing [M-WIWI-101647]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	5

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-103139	Marketing Analytics	4,5 CR	Klarmann
T-WIWI-107720	Market Research	4,5 CR	Klarmann

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Keine.

Competence Goal
Students

- possess advanced knowledge of relevant market research contents
- know many different qualitative and quantitative methods for measuring customer behavior, preparation of strategic decisions, making causal deductions, usage of social media data and sales forecasting
- possess the statistical skills required for working in marketing research

Content
This module provides in-depth knowledge of relevant quantitative and qualitative methods used in market research.Students can attend the following courses:

- The course “Market Research” provides contents of practical relevance for measuring customer attitudes and customer behavior. The participants learn using statistical methods for strategic decision-making in marketing. Students who are interested in writing their master thesis at the Marketing & Sales Research Group are required to take this course.
- The course "Marketing Analytics“ is based on "Market Research“ and teaches advanced statistical methods for analyzing relevant marketing and market research questions. Please note that a successful completion of "Market Research" is a prerequisite for the completion of "Marketing Analytics".

Workload
The total workload for this module is approximately 270 hours.

Recommendation
None

M 6.24 Module: Data Science: Intelligent, Adaptive, and Learning Information Services [M-WIWI-105661]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	2

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-109921	Advanced Machine Learning	4,5 CR	Geyer-Schulz, Nazemi
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-102762	Business Dynamics	4,5 CR	Geyer-Schulz, Glenn
T-WIWI-111267	Intelligent Agent Architectures	4,5 CR	Geyer-Schulz
T-WIWI-110915	Intelligent Agents and Decision Theory	4,5 CR	Geyer-Schulz
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- models, analyzes and optimizes the structure and dynamics of complex economic changes.
- designs and develops intelligent, adaptive or learning agents as essential elements of information services.
- knows the essential learning methods for this and can apply them (also on modern architectures) in a targeted manner.
- develops and implements personalized services, especially in the area of recommender systems.
- develops solutions in teams.

Content
The Intelligent Architectures course addresses how to design modern agent-based systems. The focus here is on software architecture and design patterns relevant to learning systems. In addition, important machine learning methods that complete the intelligent system are discussed. Examples of systems presented include key-map architectures and genetic methods.
The impact of management decisions in complex systems is considered in Business Dynamics. Understanding, modeling, and simulating complex systems enables analysis, purposeful design, and optimization of markets, business processes, regulations, and entire enterprises.
Special problems of intelligent systems are covered in Personalization and Services and Recommendersystems. The content includes approaches and methods to design user-oriented services. The measurement and monitoring of service systems is discussed, the design of personalized offers is discussed and the generation of recommendations based on collected data from products and customers is shown. The importance of user modeling and recognition is addressed, as well as data security and privacy.

Annotation
The module replaces from summer semester 2021 M-WIWI-101470 "Data Science: Advanced CRM".

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.25 Module: Design, Construction, Operation and Maintenance of Highways [M-BGU-100998]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German	4	2

Mandatory			
T-BGU-106613	Design Basics in Highway Engineering	3 CR	Zimmermann
T-BGU-106300	Infrastructure Management	6 CR	Zimmermann

Prerequisites
The selection of this module excludes the selection of the module "Highway Engineering" (WI4INGBGU2).

Competence Goal
See German version.

Annotation
None

Workload
See German version.

Recommendation
None

M 6.26 Module: Designing Interactive Information Systems [M-WIWI-104080]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	5

Compulsory Elective Courses (Election: at least 1 item)			
T-WIWI-113465	Designing Interactive Systems: Human-AI Interaction	4,5 CR	Mädche
T-WIWI-113460	Engineering Interactive Systems: AI & Wearables	4,5 CR	Mädche
Supplementary Courses (Election: at most 1 item)			
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CR	Mädche

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

Prerequisites
In this module, the courses "Designing Interactive Systems" or "Enineering Interactive Systems" must be compulsorily taken.

Competence Goal
The student

- has a comprehensive understanding of conceptual and theoretical foundations of interactive systems
- knows design processes for interactive systems
- is aware of the most important techniques and tools for designing interactive systems and knows how to apply them to real-world problems
- is able to apply design principles for the design of most important classes of interactive systems,
- creates new solutions of interactive systems teams

Content
Advanced information and communication technologies make interactive systems ever-present in the users' private and business life. They are an integral part of smartphones, devices in the smart home, mobility vehicles as well as at the working place in production and administration (e.g. in the form of dashboards).

With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. This module focuses on design processes and principles for interactive systems. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for the design of interactive systems. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

Each lecture in the module is accompanied with a capstone project that is carried out with an industry partner.

Annotation
See http://issd.iism.kit.edu/305.php for further information.

Workload
The total workload for this module is approximately 270 hours.

M 6.27 Module: Digital Marketing [M-WIWI-106258]

Responsible: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	English	4	1

Mandatory			
T-WIWI-112693	Digital Marketing	4,5 CR	Kupfer
Supplementary Courses (Election: at most 1 item)			
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CR	Klarmann, Konhäuser
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-112711	Media Management	4,5 CR	Kupfer
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	3 CR	Klarmann

Competence Certificate
The assessment is carried out as partial exams of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course, weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- have an advanced knowledge about central marketing contents
- have a fundamental understanding of the marketing instruments
- know current fundamental principles and latest trends in the field of digital marketing
- know and understand several strategic concepts and how to implement them
- are able to implement their extensive marketing knowledge in a practical context
- are able to critically discuss and question theoretical concepts and current practices in marketing
- have theoretical knowledge that is fundamental for writing a master thesis in the field of marketing
- have gained insight into scientific research that prepares them to independently write a master's thesis
- have the theoretical knowledge and skills necessary to work in or collaborate with the marketing department of a company

Content
The aim of this module is to deepen central marketing contents in different areas.

Workload
Total effort for 9 credit points: approx. 270 hours.
The exact distribution is done according to the credit points of the courses of the module.

M 6.28 Module: Digital Service Systems in Industry [M-WIWI-102808]

Responsible: Prof. Dr. Wolf Fichtner
Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	8

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CR	Satzger
T-WIWI-107043	Liberalised Power Markets	5,5 CR	Fichtner
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CR	Nickel
T-WIWI-106563	Practical Seminar Digital Service Systems	4,5 CR	Satzger

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal

Prerequisites
This module can only be assigned as an elective module.

Competence Goal
Students

- understand the basics of the management of digital services applied on an industrial context
- gain an industry-specific insight into the importance and most relevant characteristics of information systems as key components of the digitalization of business processes, products and services
- are able to transfer and apply the models and methods introduced on practical scenarios and simulations.
- understand the control and optimization methods in the sector of service management and are able to apply them properly.

Content
This module aims at deepening the fundamental knowledge of digital service management in the industrial context. Various mechanisms and methods to shape and control connected digital service systems in different industries are discussed and demonstrated with real life application cases.

Annotation
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.29 Module: Digitalization in Facility Management [M-BGU-105592]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	4	2

Mandatory			
T-BGU-108941	Digitalization in Facility and Real Estate Management	6 CR	Lennerts
Compulsory Elective (Election: at most 2 items as well as at least 3 credits)			
T-BGU-111211	Energetic Refurbishment	1,5 CR	Lennerts, Schneider
T-BGU-111212	Facility and Real Estate Management II	1,5 CR	Lennerts
T-BGU-111921	Turnkey Construction	3 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-108941 with examination of other type according to § 4 Par. 2 No. 3

according to selected course:

- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111212 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111921 with written examination according to § 4 Par. 2 No. 1

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
none

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Digitalization in Facility and Real Estate Management lecture/exercise: 60 h

according to selected courses or examinations respectively:

- Energetic Refurbishment II lecture: 15 h
- Facility and Real Estate Management II lecture: 15 h
- Turnkey Construction lecture/exercise: 30 h

independent study:

- preparation and follow-up lecture/exercises Digitalization in Facility and Real Estate Management: 40 h
- preparation of project Digitalization in Facility and Real Estate Management, incl. report and presentation (partial examination): 80 h

according to selected courses or examinations respectively:

- preparation and follow-up lectures Energetic Refurbishment II: 15 h
- examination preparation Energetic Refurbishment II (partial exam): 15 h
- preparation and follow-up lectures Facility and Real Estate Management II: 15 h
- examination preparation Facility and Real Estate Management II (partial exam): 15 h
- preparation and follow-up lecture/exercises Turnkey Construction: 30 h
- examination preparation Turnkey Construction (partial exam): 30 h

total: 270 h

Recommendation
none

M 6.30 Module: Econometrics and Statistics I [M-WIWI-101638]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)
Compulsory Elective Modules (Statistics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	5

Mandatory			
T-WIWI-111388	Applied Econometrics	4,5 CR	Schienle
Supplementary Courses (Election: between 4,5 and 5 credits)			
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-103126	Non- and Semiparametrics	4,5 CR	Schienle
T-WIWI-103127	Panel Data	4,5 CR	Heller
T-WIWI-110868	Predictive Modeling	4,5 CR	Krüger
T-WIWI-111387	Probabilistic Time Series Forecasting Challenge	4,5 CR	Krüger
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-110939	Financial Econometrics II	4,5 CR	Schienle

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1-3 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course "Applied Econometrics" [2520020] is compulsory and must be examined.

Competence Goal
The student shows an in depth understanding of advanced Econometric techniques suitable for different types of data.He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

Content
The courses of this module offer students a broad range of advanced Econometric techniques for state-of-the art data analysis.

Workload
The total workload for this module is approximately 270 hours.

M 6.31 Module: Econometrics and Statistics II [M-WIWI-101639]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (Statistics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	4

Election notes
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This module will not count towards the degree until the module "Econometrics and Statistics I" has also been successfully completed. If the module "Econometrics and Statistics I" is booked out to the additional examinations, the "Econometrics and Statistics II" module loses its curricular validity/valuation for the degree.

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Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-103126	Non- and Semiparametrics	4,5 CR	Schienle
T-WIWI-103127	Panel Data	4,5 CR	Heller
T-WIWI-103128	Portfolio and Asset Liability Management	4,5 CR	Safarian
T-WIWI-110868	Predictive Modeling	4,5 CR	Krüger
T-WIWI-111387	Probabilistic Time Series Forecasting Challenge	4,5 CR	Krüger
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-103129	Stochastic Calculus and Finance	4,5 CR	Safarian
T-WIWI-110939	Financial Econometrics II	4,5 CR	Schienle

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1-3 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
This module can only be passed if the module *"Econometrics and Statistics I"* has been finished successfully before.

Competence Goal
The student shows an in depth understanding of advanced Econometric techniques suitable for different types of data. He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

Content
This modula builds on prerequisites acquired in Module*"Econometrics and Statistics I"*. The courses of this module offer students a broad range of advanced Econometric techniques for state-of-the art data analysis.

Workload
The total workload for this module is approximately 270 hours.

M 6.32 Module: Economic Theory and its Application in Finance [M-WIWI-101502]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	6

Compulsory Elective Courses (Election: 1 item)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
Supplementary Courses (Election:)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CR	Ruckes
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-109050	Corporate Risk Management	4,5 CR	Ruckes
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
One of the courses T-WIWI-102861 "Advanced Game Theory" and T-WIWI-102609 "Advanced Topics in Economic Theory" is compulsary.

Competence Goal
The students

- have learnt the methods of formal economic modeling, particularly of General Equilibrium Theory and contract theory
- will be able to apply these methods to the topics in Finance, specifically the areas of financial markets and institutions and corporate finance
- have gained many useful insights into the relationship between firms and investors and the functioning of financial markets

Content
The mandatory course "Advanced Topics in Economic Theory" is devoted in equal parts to General Equilibrium Theory and to contract theory. The course "Asset Pricing" will apply techniques of General Equilibrium Theory to valuation of financial assets. The courses "Corporate Financial Policy" and "Finanzintermediation" will apply the techniques of contract theory to issues of corporate finance and financial institutions.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.33 Module: eEnergy: Markets, Services and Systems [M-WIWI-103720]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	2

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CR	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CR	Weinhardt
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
The student

- is aware of design options for energy and especially electricity markets and can derive implications for the market results from the market design,
- knows about current trends regarding the Smart Grid and understands affiliated modelling aproaches,
- can evaluate business models of electricity grids according to the regulation regime
- is prepared for scientific contributions in the field of energy system analysis.

Content
The module conveys scientific and practical knowledge to analyse energy markets and according business models. To do so the scientific discussion on energy market designs is evaluated and analysed. Different energy market models are presented and their design implications are evaluated. Furthermore, the electricity system is analysed with regards to being a network industry and resulting regulation and business models are discussed. Besides these traditional areas of energy economics we will look at methods and models of digitalisation in the energy sector.

Annotation
The lecture Smart Grid Applications will be available starting in the winter term 2018/19.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.34 Module: Electives in Informatics [M-WIWI-101630]

Responsible: Dr.-Ing. Michael Färber
Prof. Dr. Sanja Lazarova-Molnar
Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Informatics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	19

Compulsory Elective Area (Election:)			
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-102680	Computational Economics	4,5 CR	Shukla
T-WIWI-113363	Collective Perception in Autonomous Driving	4,5 CR	Vinel
T-WIWI-112690	Cooperative Autonomous Vehicles	4,5 CR	Vinel
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-113059	Human Factors in Autonomous Driving	4,5 CR	Vinel
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CR	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CR	Oberweis
T-WIWI-106423	Information Service Engineering	4,5 CR	Sack
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-112599	Management of IT-Projects	4,5 CR	Schätzle
T-WIWI-106340	Machine Learning 1 - Basic Methods	4,5 CR	Zöllner
T-WIWI-106341	Machine Learning 2 – Advanced Methods	4,5 CR	Zöllner
T-WIWI-112685	Modeling and Simulation	4,5 CR	Lazarova-Molnar
T-WIWI-102697	Business Process Modelling	4,5 CR	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CR	Shukla
T-WIWI-109799	Process Mining	4,5 CR	Oberweis
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
Seminars and Advanced Labs (Election:)			
T-WIWI-110144	Emerging Trends in Digital Health	4,5 CR	Sunyaev
T-WIWI-110143	Emerging Trends in Internet Technologies	4,5 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development	4,5 CR	Sunyaev
T-WIWI-111126	Advanced Lab Blockchain Hackathon (Master)	4,5 CR	Sunyaev
T-WIWI-111125	Advanced Lab Sociotechnical Information Systems Development (Master)	4,5 CR	Sunyaev
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-112914	Advanced Lab Realization of Innovative Services (Master)	4,5 CR	Oberweis
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer
T-WIWI-109786	Advanced Lab Security	4,5 CR	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	5 CR	Zöllner

T-WIWI-109983	Project Lab Machine Learning	5 CR	Zöllner
T-WIWI-113026	Trustworthy Emerging Technologies	4,5 CR	Sunyaev

Competence Certificate
The assessment is carried out as partial exams of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
The student

- has the ability to master methods and tools in a complex discipline and to demonstrate innovativeness regarding the methods used,
- knows the principles and methods in the context of their application in practice,
- is able to grasp and apply the rapid developments in the field of computer science, which are encountered in work life, quickly and correctly, based on a fundamental understanding of the concepts and methods of computer science,
- is capable of finding and defending arguments for solving problems.

Content
The thematic focus will be based on the choice of courses in the areas of Applied Technical Cognitive Systems, Business Information Systems, Critical Information Infrastructures, Information Service Engineering, Security - Usability - Society or Web Science.

Workload
The total workload for this module is approximately 270 hours.

M 6.35 Module: Electronic Markets [M-WIWI-101409]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	9

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102762	Business Dynamics	4,5 CR	Geyer-Schulz, Glenn
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CR	Weinhardt
T-WIWI-105946	Price Management	4,5 CR	Geyer-Schulz, Glenn
T-WIWI-113147	Telecommunications and Internet – Economics and Policy	4,5 CR	Mitusch

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- knows coordination and motivation methods and analyzes them regarding their efficiency,
- classifies markets and describes the roles of the participants in a formal way,
- knows the conditions for market failure and knows and develops countermeasures,
- knows institutions and market mechanisms, their fundamental theories and empirical research results,
- knows the design criteria of market mechanisms and a systematical approach for creating new markets,
- models, analyzes and optimizes the structure and dynamics of complex business applications.

Content
What are the conditions that make electronic markets develop, and how can one analyze and optimize such markets?

In this module, the selection of the type of organization as an optimization of transaction costs is treated. Afterwards, the efficiency of electronic markets (price, information and allocation efficiency) as well as reasons for market failure are described. Finally, motivational issues like bounded rationality and information asymmetries (private information and moral hazard), as well as the development of incentive schemes, are presented. Regarding the market design, especially the interdependencies of market organization, market mechanisms, institutions and products are described, and theoretical foundations are lectured.

Electronic markets are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics, such markets can be modelled. Simulations of complex systems allow the analysis and optimization of markets, business processes, policies, and organizations.

Topics include

- classification, analysis, and design of markets
- simulation of markets
- auction methods and auction theory
- automated negotiations
- nonlinear pricing
- continuous double auctions
- market-maker, regulation, control

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.36 Module: Emphasis in Informatics [M-WIWI-101628]

Responsible: Dr.-Ing. Michael Färber
Prof. Dr. Sanja Lazarova-Molnar
Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Informatics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	19

Compulsory Elective Area (Election: between 1 and 3 items)			
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-102680	Computational Economics	4,5 CR	Shukla
T-WIWI-113363	Collective Perception in Autonomous Driving	4,5 CR	Vinel
T-WIWI-112690	Cooperative Autonomous Vehicles	4,5 CR	Vinel
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-113059	Human Factors in Autonomous Driving	4,5 CR	Vinel
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CR	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CR	Oberweis
T-WIWI-106423	Information Service Engineering	4,5 CR	Sack
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-106340	Machine Learning 1 - Basic Methods	4,5 CR	Zöllner
T-WIWI-106341	Machine Learning 2 – Advanced Methods	4,5 CR	Zöllner
T-WIWI-112685	Modeling and Simulation	4,5 CR	Lazarova-Molnar
T-WIWI-102697	Business Process Modelling	4,5 CR	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CR	Shukla
T-WIWI-109799	Process Mining	4,5 CR	Oberweis
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
T-WIWI-112599	Management of IT-Projects	4,5 CR	Schätzle
Seminars and Advanced Labs (Election:)			
T-WIWI-110144	Emerging Trends in Digital Health	4,5 CR	Sunyaev
T-WIWI-110143	Emerging Trends in Internet Technologies	4,5 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development	4,5 CR	Sunyaev
T-WIWI-111126	Advanced Lab Blockchain Hackathon (Master)	4,5 CR	Sunyaev
T-WIWI-111125	Advanced Lab Sociotechnical Information Systems Development (Master)	4,5 CR	Sunyaev
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-112914	Advanced Lab Realization of Innovative Services (Master)	4,5 CR	Oberweis
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer
T-WIWI-109786	Advanced Lab Security	4,5 CR	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	5 CR	Zöllner

T-WIWI-109983	Project Lab Machine Learning	5 CR	Zöllner
T-WIWI-113026	Trustworthy Emerging Technologies	4,5 CR	Sunyaev

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
The student

- has the ability to master methods and tools in a complex discipline and to demonstrate innovativeness regarding the methods used,
- knows the principles and methods in the context of their application in practice,
- is able to grasp and apply the rapid developments in the field of computer science, which are encountered in work life, quickly and correctly, based on a fundamental understanding of the concepts and methods of Informatics,
- is capable of finding and defending arguments for solving problems.

Content
The thematic focus will be based on the choice of courses in the areas of Applied Technical Cognitive Systems, Business Information Systems, Critical Information Infrastructures, Information Service Engineering, Security - Usability - Society or Web Science.

Workload
The total workload for this module is approximately 270 hours.

M 6.37 Module: Energy and Process Technology I [M-MACH-101296]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each winter term	1 term	4	1

Mandatory			
T-MACH-102211	Energy and Process Technology I	9 CR	Bauer, Maas, Schwitzke, Velji

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module, whose sum of credits must meet the requirement of credits of this module. The
assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits
and truncated after the first decimal.

Prerequisites
None

Competence Goal
In this modul students achieve a basic understanding of the technical properties of energy conversion processes and machines.

Content
Energy and Process Technology 1:

1. thermodynamic basics and cycle processes (ITT)
2. basics of piston engines (IFKM)
3. basics of turbomachines (FSM)
4. basics of thermal turbomachines (ITS)

Annotation
All lectures and exams are hold in German only.

M 6.38 Module: Energy and Process Technology II [M-MACH-101297]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each summer term	1 term	4	1

Mandatory			
T-MACH-102212	Energy and Process Technology II	9 CR	Maas, Schwitzke

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module, whose sum of credits must meet the requirement of credits of this module. The
assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits
and truncated after the first decimal.

Prerequisites
None

Competence Goal
In this modul students achieve the ability to evaluate solitary and interconnected energy systems with respect to societal and economical aspects

Content
Energy and Process Technology 2:

1. basics in combustion and pollutant formation (ITT)
2. technical realisation and application of piston engines (IFKM) fluid flow engines (FSM) and thermal turbomachines (ITS)
3. technical aspects of energy supply systems and networks (ITS)

Annotation
All lectures and exams are hold in German only.

M 6.39 Module: Energy Economics and Energy Markets [M-WIWI-101451]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	8

Mandatory			
T-WIWI-107043	Liberalised Power Markets	5,5 CR	Fichtner
Supplementary Courses (Election:)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-112151	Energy Trading and Risk Management	3,5 CR	N.N.
T-WIWI-108016	Simulation Game in Energy Economics	3,5 CR	Genoese
T-WIWI-107446	Quantitative Methods in Energy Economics	3,5 CR	Plötz
T-WIWI-102712	Regulation Theory and Practice	4,5 CR	Mitusch

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place every semester. Re-examinations are offered at every ordinary examination date.The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The lecture Liberalised Power Markets has to be examined.

Competence Goal
The student

- gains detailed knowledge about the new requirements of liberalised energy markets,
- describes the planning tasks on the different energy markets,
- knows solution approaches to respective planning tasks.

Content
Liberalised Power Markets: The European liberalisation process, energy markets, pricing, market failure, investment incentives, market power
Energy Trade and Risk Management: trade centres, trade products, market mechanisms, position and risk management
Simulation Game in Energy Economics: Simulation of the German electricity system

Workload
The total workload for this module is approximately 270 hours.

Recommendation
The courses are conceived in a way that they can be attended independently from each other. Therefore, it is possible to start the module in winter and summer term.

M 6.40 Module: Energy Economics and Technology [M-WIWI-101452]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	5

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102793	Efficient Energy Systems and Electric Mobility	3,5 CR	Jochem
T-WIWI-102650	Energy and Environment	3,5 CR	Karl
T-WIWI-113073	Machine Learning and Optimization in Energy Systems	3,5 CR	Fichtner
T-WIWI-107464	Smart Energy Infrastructure	5,5 CR	Ardone, Pustisek
T-WIWI-102695	Heat Economy	3,5 CR	Fichtner

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place every semester. Re-examinations are offered at every ordinary examination date.The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- gains detailed knowledge about present and future energy supply technologies (focus on final energy carriers electricity and heat),
- knows the techno-economic characteristics of plants for energy provision, for energy transport as well as for energy distribution and demand,
- is able to assess the environmental impact of these technologies.

Content
Heat Economy: district heating, heating technologies, reduction of heat demand, statutory provisions
Energy Systems Analysis: Interdependencies in energy economics, energy systems modelling approaches in energy economics
Energy and Environment: emission factors, emission reduction measures, environmental impact
Efficient Energy Systems and Electric Mobility: concepts and current trends in energy efficiency, Overview of and economical, ecological and social impacts through electric mobility

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.41 Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	13

Mandatory part (Election: 1 item)			
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-113151	Entrepreneurship Seasonal School	3 CR	Terzidis
T-WIWI-102865	Business Planning	3 CR	Terzidis
T-WIWI-110985	International Business Development and Sales	6 CR	Casenave , Klarmann, Terzidis
T-WIWI-109064	Joint Entrepreneurship Summer School	6 CR	Terzidis
T-WIWI-111561	Startup Experience	6 CR	Terzidis
Supplementary Courses (Election: between 0 and 1 items)			
T-WIWI-102894	Entrepreneurship Research	3 CR	Terzidis
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
T-WIWI-102612	Managing New Technologies	3 CR	Reiß
T-WIWI-102853	Roadmapping	3 CR	Koch

Competence Certificate
See German version.

Prerequisites
None

Competence Goal
Students are familiar with the basics and contents of entrepreneurship and ideally are able to start a company during or after their studies. The courses are therefore structured sequentially in modules, although in principle they can also be attended in parallel. In this way, the skills are taught to generate business ideas, to develop inventions into innovations, to write business plans for start-ups and to successfully establish a company. In the lecture, the basics of entrepreneurship will be developed, in the seminars, individual contents will be deepened. The overall learning objective is to enable students to develop and implement business ideas.

Content
The lectures form the basis of the module and give an overview of the overall topic. The seminars deepen the phases of the foundation processes, in particular the identification of opportunities, the development of a value proposition (especially based on inventions and technical innovations), the design of a business model, business planning, the management of a start-up, the implementation of a vision as well as the acquisition on resources and the handling of risks. The lecture Entrepreneurship provides an overarching and connecting framework for this.

Annotation
Please note: Seminars offered by Prof. Terzidis (or the members of his research group) are not eligible for crediting in a seminar module of the WiWi degree programs. Exception: Seminar "Entrepreneurship Research".

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.42 Module: Environmental Economics [M-WIWI-101468]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	2

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102650	Energy and Environment	3,5 CR	Karl
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba
T-WIWI-102615	Environmental Economics and Sustainability	3 CR	Walz
T-WIWI-102616	Environmental and Resource Policy	4 CR	Walz
T-BGU-111102	Environmental Law	3 CR	Smeddinck

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students

- understand the treatment of non-market resources as well as future resource shortages
- are able to model markets of energy and environmental goods
- are able to assess the results of government intervention
- know legal basics and are able to evaluate conflicts with regard to legal situation

Content
Environmental degradation and increasing resource use are global challenges, which have to be tackled on a worldwide level. The module addresses these challenges from the perspective of economics, and imparts the fundamental knowledge of environmental and sustainability economics, and environmental and resource policy to the students. Additional courses address environmental law, environmental pressure, and applications to the transport sector.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Knowledge of microeconomics is a prerequisite. For this reason, successful participation in the course *Economics I (Microeconomics)* [2600012] or a comparable course is strongly recommended.

M 6.43 Module: Experimental Economics [M-WIWI-101505]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	5

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-102862	Predictive Mechanism and Market Design	4,5 CR	Reiß
T-WIWI-102863	Topics in Experimental Economics	4,5 CR	Reiß

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None.

Competence Goal
Students

- are acquainted with the methods of Experimental Economics along with its strengths and weaknesses;
- understand how theory-guided research in Experimental Economics interacts with the development of theory;
- are provided with foundations in data analysis;
- design an economic experiment and analyze its outcome.

Content
The module Experimental Economics offers an introduction into the methods and topics of Experimental Economics. It also fosters and extends knowledge in theory-guided experimental economics and its interaction with theory development. Throughout the module, readings of selected papers are required.

Annotation
The course "Predictive Mechanism and Market Design" is offered every second winter semester, e.g. WS2013 / 14, WS2015 / 16, ...

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Basic knowledge in mathematics, statistics, and game theory is assumed.

M 6.44 Module: Extracurricular Module in Engineering [M-WIWI-101404]

Responsible: Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Once	1 term	4	5

Compulsory Elective Courses (Election: between 9 and 12 credits)			
T-WIWI-106291	PH APL-ING-TL01	3 CR	
T-WIWI-106292	PH APL-ING-TL02	3 CR	
T-WIWI-106293	PH APL-ING-TL03	3 CR	
T-WIWI-106294	PH APL-ING-TL04 ub	0 CR	
T-WIWI-106295	PH APL-ING-TL05 ub	0 CR	
T-WIWI-106296	PH APL-ING-TL06 ub	0 CR	
T-WIWI-108384	PH APL-ING-TL07	3 CR	

Competence Certificate
The assessment of the module is determined by the respective module corrdinator. It can either be in the form of a general exam or partial exams, and must contain at least 9 credit points (max. 12 credits) and at least 6 hours per week (max. 8 hours per week). The examination may contain presentations, experiments, laboratories, term papers, etc. At least 50 percent of the module examination has to be in the form of a written or an oral examination (according to Section 4 (2), 1 or 2 of the examination regulation).

The formation of the overall grade of the module will be determined by the respective module coordinator.

Prerequisites
The current regulations and guidance on the procedure for applying for an extracurricular module in engineering are explained in detail at https://www.wiwi.kit.edu/APIng-Modul.php.

Competence Goal
Through the extracurricular engineering module, the student is able to deal with technical topics and issues in depth.

The concrete learning objectives are coordinated with the respective module supervisor of the module.

Workload
The total workload for this module is about 270 hours (9 credits). The distribution is based on the credit points of the courses completed as part of the module.

M 6.45 Module: Facility Management in Hospitals for Industrial Engineering [M-BGU-106453]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-BGU-108004	Facility Management in Hospitals	6 CR	Lennerts
Comnpulsory Elective (Election: at most 2 items as well as at least 3 credits)			
T-BGU-111218	Upgrading of Existing Buildings	3 CR	Lennerts
T-BGU-111211	Energetic Refurbishment	1,5 CR	Lennerts, Schneider
T-BGU-111212	Facility and Real Estate Management II	1,5 CR	Lennerts
T-BGU-111217	Project Development with Case Study	1,5 CR	Lennerts

Competence Certificate
- 'Teilleistung' T-BGU-108004 with examination of other type according to § 4 Par. 2 No. 3

according to selected course:

- 'Teilleistung' T-BGU-111218 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111212 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111217 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
module will be offered newly as from winter term 2023/24;
replaces module 'Facility Management in Hospitals' (M-BGU-105597)

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Facility Management in Hospitals lecture/exercise: 60 h

according to selected courses or examinations respectively:

- Upgrading of Existing Buildings lecture/exercise: 45 h
- Energetic Refurbishment II lecture: 15 h
- Facility and Real Estate Management II lecture: 15 h
- Project Development with Case Study lecture: 15 h

independent study:

- preparation and follow-up lecture/exercises Facility Management in Hospitals: 45 h
- preparation of term paper Facility Management in Hospitals (partial exam): 75 h

according to selected courses or examinations respectively:

- preparation and follow-up lecture/exercises Upgrading of Existing Buildings: 15 h
- examination preparation Upgrading of Existing Buildings(partial exam): 30 h
- preparation and follow-up lectures Energetic Refurbishment II: 15 h
- examination preparation Energetic Refurbishment II (partial exam): 15 h
- preparation and follow-up lectures Facility and Real Estate Management II: 15 h
- examination preparation Facility and Real Estate Management II (partial exam): 15 h
- preparation and follow-up lectures Project Development with Case Study: 15 h
- examination preparation Project Development with Case Study (partial exam): 15 h

total: 270 h

Recommendation
none

M 6.46 Module: Finance 1 [M-WIWI-101482]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	1

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- has core skills in economics and methodology in the field of finance
- assesses corporate investment projects from a financial perspective
- is able to make appropriate investment decisions on financial markets

Content
The courses of this module equip the students with core skills in economics and methodology in the field of modern finance. Securities which are traded on financial and derivative markets are presented, and frequently applied trading strategies are discussed. A further focus of this module is on the assessment of both profits and risks in security portfolios and corporate investment projects from a financial perspective.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.47 Module: Finance 2 [M-WIWI-101483]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	9

Election notes
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This module will not count towards the degree until the module *Finance 1* has also been successfully completed. If the module Finance 1 is booked out to the additional examinations, the *Finance 2* module loses its curricular validity/valuation for the degree.

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Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CR	Ruckes
T-WIWI-110513	Advanced Empirical Asset Pricing	4,5 CR	Thimme
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-110995	Bond Markets	4,5 CR	Uhrig-Homburg
T-WIWI-110997	Bond Markets - Models & Derivatives	3 CR	Uhrig-Homburg
T-WIWI-110996	Bond Markets - Tools & Applications	1,5 CR	Uhrig-Homburg
T-WIWI-109050	Corporate Risk Management	4,5 CR	Ruckes
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102900	Financial Analysis	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-102621	Valuation	4,5 CR	Ruckes

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
It is only possible to choose this module in combination with the module *Finance 1*. The module is passed only after the final partial exam of *Finance 1* is additionally passed.

Competence Goal
The student is in a position to discuss, analyze and provide answers to advanced economic and methodological issues in the field of modern finance.

Content
The module Finance 2 is based on the module Finance 1. The courses of this module equip the students with advanced skills in economics and methodology in the field of modern finance on a broad basis.

Annotation
The courses *eFinance: Information Engineering and Management for Securities Trading* [2540454] and *Financial Analysis* [2530205] can be chosen from summer term 2015 on.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.48 Module: Finance 3 [M-WIWI-101480]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	9

Election notes
++

This module will not count towards the degree until the modules *Finance 1* and *Finance 2* have also been successfully completed. If the modules *Finance 1* and/or *Finance 2* are booked out to the additional examinations, the *Finance 3* module loses its curricular validity/valuation for the degree.

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Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-113469	Advanced Corporate Finance	4,5 CR	Ruckes
T-WIWI-110513	Advanced Empirical Asset Pricing	4,5 CR	Thimme
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-110995	Bond Markets	4,5 CR	Uhrig-Homburg
T-WIWI-110997	Bond Markets - Models & Derivatives	3 CR	Uhrig-Homburg
T-WIWI-110996	Bond Markets - Tools & Applications	1,5 CR	Uhrig-Homburg
T-WIWI-109050	Corporate Risk Management	4,5 CR	Ruckes
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102900	Financial Analysis	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-110933	Web App Programming for Finance	4,5 CR	Thimme

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
It is only possible to choose this module in combination with the module *Finance 1*and *Finance 2*. The module is passed only after the final partial exams of *Finance 1 and Finance 2* are additionally passed.

Competence Goal
The student is in a position to discuss, analyze and provide answers to advanced economic and methodological issues in the field of modern finance.

Content
The courses of this module equip the students with advanced skills in economics and methodology in the field of modern finance on a broad basis.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.49 Module: Foundations for Advanced Financial -Quant and -Machine Learning Research [M-WIWI-105894]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	see Annotations	1 term	English	4	1

Mandatory			
T-WIWI-111846	Fundamentals for Financial -Quant and -Machine Learning Research	9 CR	Ulrich

Competence Certificate
Due to the professor's research sabbatical, the BSc module "Financial Data Science" and MSc module "Foundations for Advanced Financial -Quant and -Machine Learning Research" and the MSc module "Advanced Machine Learning and Data Science" along with the respective examinations will not be offered in SS2023. Bachelor and Master thesis projects are not affected and will be supervised.

The module examination is an alternative exam assessment with a maximum score of 100 points to be achieved. These points are distributed over 4 worksheets to be submitted during the semester. The worksheets cover the respective material of the module and are handed out, worked on and assessed in lecture weeks 3 (10 points), 6 (20 points), 9 (30 points) and 12 (40 points).

The module-wide exam (all 4 worksheets) must be taken in the same semester.

The worksheets are a mixture of analytical tasks and programming tasks with financial data.

Competence Goal
This MSc module teaches students fundamental stats and analytics concepts, as well necessary financial economic intuition, necessary to identify, design and execute interesting research questions in quant finance and financial machine learning.
Topics include: Maximum Likelihood learning of arma-garch models, expectation maximization learning applied to stochastic volatility and valuation models, Kalman filter techniques to learn latent states, estimation of affine jump diffusion models with options and higher-order moments, stochastic calculus, dynamic modeling of asset markets (bond, equity, options), equilibrium determination of risk premiums, risk premiums for higher moment risk, risk decomposition (fundamental vs idiosyncratic), option-implied return distributions, mixture-density-networks and neural nets.

Content
Learning Objectives: Skills and understanding of how to successfully set-up, execute and interpret financial data driven research with the following methods: MLE, Kalman Filter, Expectation Maximization, Option Pricing, dynamic asset pricing theory, backward-looking historical return densities, forward-looking options-implied return densities, mixture-density-network, neural networks. Programming is not taught in this course, yet, some graded and non-graded exercises might make heavy use of software based data analysis. See the course's pre-requisites and comments in the modul handbook.

Annotation

- Strongly recommended to have good knowledge in financial econometrics (MLE, OLS, GLS, ARMA-GARCH), mathematics (differential equations, difference equations and optimization), investments (CAPM, factor models), asset pricing (SDF, SDF pricing), derivatives (Black-Scholes, risk-neutral pricing), and programming of statistical concepts (Java or R or Python or Matlab or C or ...)
- Strongly recommended to have a strong interest for interdisciplinary research work in statistics, programming, applied math and financial economics.
- Students lacking the prior knowledge might find the resources of the Chair helpful: www.youtube.com/c/cram-kit.

Workload
The total workload for this course is approximately 270 hours. This is for a student with the appropriate prior knowledge in financial econometrics, finance, mathematics and programming. Students without programming experience of statistical concepts will need to invest extra time. Students who have struggled in math- or programming- or finance- oriented classes, will find this course very challenging. Please check the pre-requisites and comments in the module handbook.

M 6.50 Module: Fundamentals of Transportation [M-BGU-101064]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	2 terms	German/English	4	6

Compulsory Examination (Election: between 1 and 2 items as well as between 3 and 6 credits)			
T-BGU-106609	Characteristics of Transportation Systems	3 CR	Vortisch
T-BGU-106610	Transportation Systems	3 CR	Vortisch
Electives (Election: between 1 and 2 items as well as between 3 and 6 credits)			
T-BGU-106611	Freight Transport	3 CR	Chlond
T-BGU-106301	Long-Distance and Air Traffic	3 CR	Chlond
T-BGU-101005	Tendering, Planning and Financing in Public Transport	3 CR	Vortisch
T-BGU-100014	Seminar in Transportation	3 CR	Chlond, Vortisch
T-BGU-112552	Seminar on Modeling and Simulation in Transportation	3 CR	Kagerbauer, Vortisch
T-BGU-103425	Mobility Services and New Forms of Mobility	3 CR	Kagerbauer
T-BGU-103426	Strategic Transport Planning	3 CR	Waßmuth
T-BGU-106608	Information Management for Public Mobility Services	3 CR	Vortisch
T-BGU-111057	Sustainability in Mobility Systems	3 CR	Kagerbauer

Prerequisites
None

Competence Goal
See German version.

Recommendation
None

M 6.51 Module: Generation and Transmission of Renewable Power [M-ETIT-101164]

Responsible: Dr.-Ing. Bernd Hoferer
Prof. Dr.-Ing. Thomas Leibfried

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	4

compulsory optional subject (Election: at least 9 credits)			
T-ETIT-101941	Power Transmission and Power Network Control	5 CR	Leibfried
T-ETIT-101915	High-Voltage Test Technique	4 CR	Badent

Prerequisites
The module is passed only after the final partial exam of the module "M-ETIT-101163 Hochspannungstechnik" is additionally passed.

Competence Goal
The student

- has wide knowledge of electrical power engineering,
- is capable to analyse and develop electrical power engineering systems.

Content
The module deals with wide knowledge about the electrical power engineering. This ranges from the electric power equipment networks in terms of function, structure and interpretation on the calculation of electrical power networks to special areas such as the FACTS elements or power transformers.

M 6.52 Module: Global Production and Logistics [M-MACH-101282]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	6

Mandatory			
T-MACH-110991	Global Production	5 CR	Lanza
T-MACH-111003	Global Logistics	4 CR	Furmans

Competence Certificate
Oral exams: duration approx. 5 min per credit point

Written exams: duration approx. 20 - 25 min per credit point

Amount, type and scope of the success control can vary according to the individually choice.

Prerequisites
None

Competence Goal
The students

- are able to analyze the main topics of global production and logistics.
- can explain the main topics about planning and operations of global supply chains and are able to use simple models for planning.
- are capable to name the main topics about planning of global production networks.

Content
The module Global Production and Logistics provides comprehensive and well-founded basics for the main topics of global production and logistics. The lectures aim to show opportunities and market conditions for global enterprises. Part 1 focuses on economic backgrounds, opportunities and risks of global production. Part 2 focuses on the structure of international logistics, their modeling, design and analysis. The threats in international logistics are discussed in case studies.

Workload
The work load is about 270 hours, corresponding to 9 credit points.

Learning type
Lectures, seminars, workshops, excursions

M 6.53 Module: Growth and Agglomeration [M-WIWI-101496]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	5

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-112816	Growth and Development	4,5 CR	Ott
T-WIWI-103107	Spatial Economics	4,5 CR	Ott

Competence Certificate
The assessment is carried out as partial written exams (see the lectures descriptions).

The overall grade for the module is the average of the grades for each course weighted by the credits.

Prerequisites
None

Competence Goal
The student

- gains deepened knowledge of micro-based general equilibrium models
- understands how based on individual optimizing decisions aggregate phenomena like economic growth or agglomeration (cities / metropolises) result
- is able to understand and evaluate the contribution of these phenomena to the development of economic trends
- can derive policy recommendations based on theory

Content
The module includes the contents of the lectures *Endogenous Growth Theory*, *Spatial Economics* and *Dynamic Macroeconomics*. While the first lecture focuses on dynamic programming in modern macroeconomics, the other two lectures are more formal and analytical.

The common underlying principle of all three lectures in this module is that, based on different theoretical models, economic policy recommendations are derived.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Attendance of the course *Introduction Economic Policy* [2560280] is recommended.

Successful completion of the courses*Economics I: Microeconomics*and*Economics II: Macroeconomics*is required.

M 6.54 Module: Handling Characteristics of Motor Vehicles [M-MACH-101264]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	5

Vehicle Properties (Election: at least 9 credits)			
T-MACH-105152	Handling Characteristics of Motor Vehicles I	3 CR	Unrau
T-MACH-105153	Handling Characteristics of Motor Vehicles II	3 CR	Unrau
T-MACH-105154	Vehicle Comfort and Acoustics I	3 CR	Gauterin
T-MACH-105155	Vehicle Comfort and Acoustics II	3 CR	Gauterin
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gauterin, Gießler

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- knows and understands the characteristics of vehicles, owing to the construction and design tokens,
- knows and understands especially the factors being relevant for comfort and acoustics
- is capable of fundamentally evaluating and rating handling characteristics.

Content
See courses.

Workload
The total work load for this module is about 270 Hours (9 Credits). The partition of the work load is carried out according to the credit points of the courses of the module. The work load for courses with 4.5 credit points is about 135 hours, and for courses with 3 credit points about 90 hours. The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam duration and the time that is required to achieve the objectives of the module as an average student with an average performance.

Recommendation
Knowledge of the content of the courses *Engineering Mechanics I* [2161238], *Engineering Mechanics II* [2162276] and *Basics of Automotive Engineering I* [2113805], *Basics of Automotive Engineering II* [2114835] is helpful.

M 6.55 Module: High-Voltage Technology [M-ETIT-101163]

Responsible: Dr.-Ing. Bernd Hoferer
Prof. Dr.-Ing. Thomas Leibfried

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	2 terms	4	2

Mandatory			
T-ETIT-110266	High-Voltage Technology	6 CR	Badent
T-ETIT-100723	Electronics and EMC	3 CR	Sack

Competence Goal
The student

- has wide knowledge of electrical power engineering,
- is capable to analyse and develop electrical power engineering systems.
- know coupling mechanisms and possible coupling paths for interference signals in electronic circuits and systems, as well as measures for interference suppression and for the functionally reliable construction of such systems.

M 6.56 Module: Highway Engineering [M-BGU-100999]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each summer term	1 term	4	2

Mandatory			
T-BGU-106300	Infrastructure Management	6 CR	Zimmermann
T-BGU-101860	Special Topics in Highway Engineering and Environmental Impact Assessment	3 CR	Zimmermann

Prerequisites
The selection of this module excludes the selection of the module "Design, Construction, Operation and Maintenance of Highways" (WI4INGBGU1).

Competence Goal
See German version.

Annotation
None

Workload
See German version.

Recommendation
None

M 6.57 Module: Incentives, Interactivity & Decisions in Organizations [M-WIWI-105923]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	2

Elective Offer (Election:)			
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-111912	Advanced Topics in Digital Management	3 CR	Nieken
T-WIWI-111913	Advanced Topics in Human Resource Management	3 CR	Nieken
T-WIWI-111806	Behavioral Lab Exercise	4,5 CR	Nieken, Scheibehenne
T-WIWI-113465	Designing Interactive Systems: Human-AI Interaction	4,5 CR	Mädche
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-111385	Responsible Artificial Intelligence	4,5 CR	Weinhardt
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams of the courses in this module. The assessment procedures are described for each course in the module separately.

The overall grade of the module is the average of grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Please refer to the course descriptions for potential restrictions regarding an individual course.

Competence Goal
The student

- understands and analyses challenges and objectives within organizations
- applies economic models and empirical methods to analyze and solve challenges with a focus on the workplace and future of work
- understands the impact of digitalization and new information and communication technology on the work life and management decisions
- knows how to apply scientific research methods and understands the underlying problems

Content
The module „Incentives, Interactivity & Decisions in Organizations" offers an interdisciplinary approach to study incentive structures, the role of interactivity in information systems, and decision making in organizations. The module specifically focuses on topics related to the workplace and the future of work in organizations. The topics range from designing incentive systems and interactive systems to leadership, decision making, as well as understanding human behavior. All courses in the module foster active participation and allow students to learn state-of-the-art research methods and apply them to real-world challenges.

Workload
Total workload for 9 credits: approx. 270 hours.

Recommendation
Knowledge of Human Resource Management, microeconomics, game theory, and statistics is recommended.

M 6.58 Module: Industrial Production II [M-WIWI-101471]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German/English	4	5

Mandatory			
T-WIWI-102631	Planning and Management of Industrial Plants	5,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CR	Bosch, Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CR	Schultmann
T-WIWI-102828	Supply Chain Management in the Automotive Industry	3,5 CR	Heupel, Lang
T-WIWI-103134	Project Management	3,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-112103	Global Manufacturing	3,5 CR	Sasse
T-WIWI-113107	Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context	3,5 CR	Schultmann

Competence Certificate
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course *Planning and Managing of Industrial Plants* [2581952] and one further single course of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course *Planning and Managing of Industrial Plants* [2581952] and at least one additional activity are compulsory and must be examined.

Competence Goal

- Students shall be able to describe the tasks of tactical production management with special attention drawn upon industrial plants.
- Students shall understand the relevant tasks in plant management (projection, realisation and supervising tools for industrial plants).
- Students shall be able to describe the special need of a techno-economic approach to solve problems in the field of tactical production management.
- Students shall be proficient in using selected techno-economic methods like investment and cost estimates, plant layout, capacity planning, evaluation principles of production techniques, production systems as well as methods to design and optimize production systems.
- Students shall be able to evaluate techno-economical approaches in planning tactical production management with respect to their efficiency, accuracy and relevance for industrial use.

Content

- Planning and Management of Industrial Plants: Basics, circulation flow starting from projecting to techno-economic evaluation, construction and operating up to plant dismantling.

Annotation
Apart from the core course the courses offered are recommendations and can be replaced by courses from the Module Industrial Production III.

Workload
Total effort will account to 270 hours (9 credit points) and can be allocated according to the credit point rating. Therefore, a course with 3.5 credits requires an effort of approximately 105h and a course with 5.5 credits 165h.

The total effort for each course consists of attending lectures and tutorials, examination times and the time an average student needs to prepare himself in order to pass the exam with an average grade.

M 6.59 Module: Industrial Production III [M-WIWI-101412]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German/English	4	5

Mandatory			
T-WIWI-102632	Production and Logistics Management	5,5 CR	Schultmann
Supplementary Courses from Module Industrial Production II (Election: at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-112103	Global Manufacturing	3,5 CR	Sasse
T-WIWI-113107	Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context	3,5 CR	Schultmann
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102763	Supply Chain Management with Advanced Planning Systems	3,5 CR	Bosch, Göbelt
T-WIWI-102826	Risk Management in Industrial Supply Networks	3,5 CR	Schultmann
T-WIWI-102828	Supply Chain Management in the Automotive Industry	3,5 CR	Heupel, Lang
T-WIWI-103134	Project Management	3,5 CR	Schultmann

Competence Certificate
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course *Production and Logistics Management* [2581954] and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course *Production and Logistics Management* [2581954] and at least one additional activity are compulsory and must be examined.

Competence Goal

- Students describe the tasks concerning general problems of an operative production and logistics management.
- Students describe the planning tasks of supply chain management.
- Students use proficiently approaches to solve general planning problems.
- Students explain the existing interdependencies between planning tasks and applied methods.
- Students describe the mail goals and set-up of software supporting tools in production and logistics management (i.e. APS, PPS-, ERP- and SCM Systems).
- Students discuss the scope of these software tools and their general disadvantages.

Content

- Planning tasks and exemplary methods of production planning and control in supply chain management.
- Supporting software tools in production and logistics management (APS, PPS- and ERP Systems).
- Project management in the field of production and supply chain management.

Annotation
Apart from the core course the courses offered are recommendations and can be replaced by courses from the Module Industrial Production II.

Workload
The total amount of work for this module is approx. 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module.

The total number of hours per course results from the effort required to attend the lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.60 Module: Informatics [M-WIWI-101472]

Responsible: Dr.-Ing. Michael Färber
Prof. Dr. Sanja Lazarova-Molnar
Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. Alexey Vinel
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: Informatics

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	18

Compulsory Elective Area (Election:)			
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-102680	Computational Economics	4,5 CR	Shukla
T-WIWI-112690	Cooperative Autonomous Vehicles	4,5 CR	Vinel
T-WIWI-113363	Collective Perception in Autonomous Driving	4,5 CR	Vinel
T-WIWI-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
T-WIWI-113059	Human Factors in Autonomous Driving	4,5 CR	Vinel
T-WIWI-109270	Human Factors in Security and Privacy	4,5 CR	Volkamer
T-WIWI-102661	Database Systems and XML	4,5 CR	Oberweis
T-WIWI-110346	Supplement Enterprise Information Systems	4,5 CR	Oberweis
T-WIWI-110372	Supplement Software- and Systemsengineering	4,5 CR	Oberweis
T-WIWI-106423	Information Service Engineering	4,5 CR	Sack
T-WIWI-102666	Knowledge Discovery	4,5 CR	Färber
T-WIWI-112599	Management of IT-Projects	4,5 CR	Schätzle
T-WIWI-106340	Machine Learning 1 - Basic Methods	4,5 CR	Zöllner
T-WIWI-106341	Machine Learning 2 – Advanced Methods	4,5 CR	Zöllner
T-WIWI-112685	Modeling and Simulation	4,5 CR	Lazarova-Molnar
T-WIWI-102697	Business Process Modelling	4,5 CR	Oberweis
T-WIWI-102679	Nature-Inspired Optimization Methods	4,5 CR	Shukla
T-WIWI-109799	Process Mining	4,5 CR	Oberweis
T-WIWI-110848	Semantic Web Technologies	4,5 CR	Käfer
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
Seminars and Advanced Labs (Election: between 0 and 1 items)			
T-WIWI-110144	Emerging Trends in Digital Health	4,5 CR	Sunyaev
T-WIWI-110143	Emerging Trends in Internet Technologies	4,5 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development	4,5 CR	Sunyaev
T-WIWI-111126	Advanced Lab Blockchain Hackathon (Master)	4,5 CR	Sunyaev
T-WIWI-111125	Advanced Lab Sociotechnical Information Systems Development (Master)	4,5 CR	Sunyaev
T-WIWI-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Instituts AIFB
T-WIWI-112914	Advanced Lab Realization of Innovative Services (Master)	4,5 CR	Oberweis
T-WIWI-108439	Advanced Lab Security, Usability and Society	4,5 CR	Volkamer
T-WIWI-109786	Advanced Lab Security	4,5 CR	Volkamer

T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	5 CR	Zöllner
T-WIWI-113026	Trustworthy Emerging Technologies	4,5 CR	Sunyaev

Competence Certificate
The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
It is only allowed to choose one lab.

Competence Goal
The student

- has the ability to master methods and tools in a complex discipline and to demonstrate innovativeness regarding the methods used,
- knows the principles and methods in the context of their application in practice,
- is able to grasp and apply the rapid developments in the field of computer science, which are encountered in work life, quickly and correctly, based on a fundamental understanding of the concepts and methods of computer science,
- is capable of finding and defending arguments for solving problems.

Content
The thematic focus will be based on the choice of courses in the areas of Applied Technical Cognitive Systems, Business Information Systems, Critical Information Infrastructures, Information Service Engineering, Security - Usability - Society or Web Science.

Workload
The total workload for this module is approximately 270 hours. The total number of hours per course is calculated from the time required to attend the lectures and exercises, as well as the examination times and the time required for an average student to achieve the learning objectives of the module.

M 6.61 Module: Information Engineering [M-WIWI-101411]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	1 term	4	8

Supplementary Courses (Election:)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- understands and analyzes the central role of information as an economic good, a production factor, and a competitive factor,
- identifies, evaluates, prices, and markets information goods,
- analyze and evaluate existing markets regarding the missing incentives and the optimal solution of a given market mechanism, respectively,
- develop solutions in teams.

Content
In the courses of the module the student can deepen his knowledge on the one hand on the design and operation of markets and on the other hand on the impact of digital goods in network industries regarding the pricing policies, business strategies and regulation issues. If choosen, the course Special Topics in Information Engineering & Management additionally provides an opportunity of practical research in the aforementioned range of subjects.

Annotation
All practical Seminars offered at the IM can be chosen for *Special Topics in Information Systems*. Please update yourself on www.iism.kit.edu/im/lehre.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.62 Module: Information Systems in Organizations [M-WIWI-104068]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	5

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche
T-WIWI-113465	Designing Interactive Systems: Human-AI Interaction	4,5 CR	Mädche
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CR	Mädche

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The student

- has a comprehensive understanding of conceptual and theoretical foundations of informations systems in organizations
- is aware of the most important classes of information systems used in organizations:. process-centric, information-centric and people-centric information systems.
- knows the most important activities required to execute in the pre-implementation, implementation and post-implementation phase of information systems in organizations in order to create business value
- has a deep understanding of key capabilities of business intelligence systems and/or interactive information systems used in organizations

Content
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, companies have to rethink their way of doing business, from an internal as well as an external digitalization perspective.

This module focuses on the internal digitalization perspective. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for information systems in organizations. The students get the necessary knowledge to guide the successful digitalization of organizations. Each lecture in the module is accompanied with a capstone project that is carried out in cooperation with an industry partner.

Annotation
New module starting summer term 2018.

Workload
The total workload for this module is approximately 270 hours.

M 6.63 Module: Innovation and Growth [M-WIWI-101478]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	5

Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-112822	Economics of Innovation	4,5 CR	Ott
T-WIWI-112816	Growth and Development	4,5 CR	Ott

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students shall be given the ability to

- know the basic techniques for analyzing static and dynamic optimization models that are applied in the context of micro- and macroeconomic theories
- understand the important role of innovation to the overall economic growth and welfare
- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Content
The module includes courses that deal with issues of innovation and growth in the context of micro-and macroeconomic theories. The dynamic analysis makes it possible to analyze the consequences of individual decisions over time, and sheds light on the tension between static and dynamic efficiency in particular. In this context is also analyzed, which policy is appropriate to carry out corrective interventions in the market and thus increase welfare in the presence of market failure.

Workload
Total expenditure of time for 9 credits: 270 hours

Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

The exact distribution is subject to the credits of the courses of the module.

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

M 6.64 Module: Innovation Economics [M-WIWI-101514]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	3

Compulsory Elective Courses (Election: between 9 and 10 credits)			
T-WIWI-112822	Economics of Innovation	4,5 CR	Ott
T-WIWI-102906	Methods in Economic Dynamics	1,5 CR	Ott
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
T-WIWI-102789	Seminar in Economic Policy	3 CR	Ott

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students shall be given the ability to

- understand the important role of innovation for economic growth and welfare
- understand the relevance of alternative incentive mechanisms for the emergence and dissemination of innovations
- know basic terms of product and innovation concepts
- know fundamental concepts of innovation management
- work with fundamental theoretical innovation models and to implement them in appropriate computer algebra systems
- query appropriate data sources and to analyse and visualise them using statistical methods

Content
The module provides students with knowledge about implications of technological and organizational changes.

Addressed economic issues are incentives for developing innovations, diffusion processes, and associated effects. In this context the module analyses appropriate policies in the presence of market failures to take corrective action on the market process and thus to increase the dynamic efficiency of economies.

Furthermore, the module offers the possibility to learn about different aspects of theoretical modelling of innovation-based growth as a part of the seminar and the methods-workshop. This includes the implementation of formal models in computer algebra systems as well as recording, processing and econometric analysis of related data from relational databases (concerning for example patents or trademarks). Moreover, methods of network theory are applied.

Finally, the module emphasises the business perspective: Issues of all stages of innovation processes will be discussed, from innovation strategies up to the market commercialisation.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012] and Economics II [2600014]. Further, it is assumed that students have interest in using quantiative-mathematical methods.

M 6.65 Module: Innovation Management [M-WIWI-101507]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	11

Mandatory			
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
Compulsory Elective Courses (Election: 1 item)			
T-WIWI-108875	Digital Transformation and Business Models	3 CR	Koch
T-WIWI-112143	Development of Sustainable Business Models	3 CR	Weissenberger-Eibl
T-WIWI-111823	Successful Transformation Through Innovation	3 CR	Busch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-110263	Methods in Innovation Management	3 CR	Koch
T-WIWI-102853	Roadmapping	3 CR	Koch
T-WIWI-102858	Technology Assessment	3 CR	Koch
T-WIWI-102854	Technologies for Innovation Management	3 CR	Koch
Supplementary Courses (Election: 1 item)			
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-108875	Digital Transformation and Business Models	3 CR	Koch
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
T-WIWI-111823	Successful Transformation Through Innovation	3 CR	Busch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-110263	Methods in Innovation Management	3 CR	Koch
T-WIWI-102853	Roadmapping	3 CR	Koch
T-WIWI-102854	Technologies for Innovation Management	3 CR	Koch
T-WIWI-102858	Technology Assessment	3 CR	Koch

Competence Certificate
See German version.

Prerequisites
The lecture “Innovation Management: Concepts, Strategies and Methods” and one of the seminars of the chair for Innovation and Technology Management are compulsory. The third course can be chosen from the courses of the module.

Competence Goal
Students develop a comprehensive understanding of the innovation process and its conditionality. There is an additional focus on the concepts and processes which are of particular relevance with regard to shaping the entire process. Various strategies and methods are then taught based on this.

After completing the module, students should have developed a systemic understanding of the innovation process and be able to shape this by developing and applying suitable methods.

Content
The Innovation Management: Concepts, Strategies and Methods lecture course teaches concepts, strategies and methods which help students to form a systemic understanding of the innovation process and how to shape it. Building on this holistic understanding, the seminar courses then go into the subjects in greater depth and address specific processes and methods which are central to innovation management.

Annotation
Seminars offered by Prof. Terzidis (or the members of his research group) are not eligible for crediting in a seminar module of the WiWi degree programs. Exception: Seminar "Entrepreneurship Research".

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.66 Module: Integrated Production Planning [M-MACH-101272]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German	4	3

Mandatory			
T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0	9 CR	Lanza

Competence Certificate
Written Exam (120 min)

Prerequisites
none

Competence Goal
The students

- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning they have learned about to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.

Content
Within this engineering sciences-oriented module the students will get to learn principle aspects of organization and planning of production systems.

Workload
regular attendance: 63 hours
self-study: 207 hours

Learning type
Lecture, exercise, excursion

M 6.67 Module: Intellectual Property Law [M-INFO-101215]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	5

Intellectual Property Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-101308	Copyright	3 CR	N.N.
T-INFO-101313	Trademark and Unfair Competition Law	3 CR	Matz
T-INFO-101307	Internet Law	3 CR	N.N.
T-INFO-108462	Selected Legal Issues of Internet Law	3 CR	N.N.
T-INFO-101310	Patent Law	3 CR	Werner

Prerequisites
None

M 6.68 Module: Lean Management in Construction [M-BGU-101884]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	4	4

Election notes
The course Project Management in Construction and Real Estate Industry II is only allowed to be selected if the selectable course Project Management in Construction and Real Estate Industry I has been passed in the context of another module.

Mandatory			
T-BGU-108000	Lean Construction	4,5 CR	Haghsheno
T-BGU-101007	Project Paper Lean Construction	1,5 CR	Haghsheno
Electives (Election: between 1 and 2 items as well as between 3 and 4,5 credits)			
T-BGU-111921	Turnkey Construction	3 CR	Haghsheno
T-BGU-111922	Civil Engineering Structures and Regenerative Energies	3 CR	Haghsheno
T-BGU-103427	Site Management	1,5 CR	Haghsheno
T-BGU-111211	Energetic Refurbishment	1,5 CR	Lennerts, Schneider
T-BGU-103432	Project Management in Construction and Real Estate Industry I	3 CR	Haghsheno
T-BGU-103433	Project Management in Construction and Real Estate Industry II	3 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-108000 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-101007 with examination of other type according to § 4 Par. 2 No. 3

according to selected course:

- 'Teilleistung' T-BGU-111921 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-111922 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103432 with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-BGU-103433 with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
As from summer term 2022 the selectable courses are partly replaced. With queries about the completion of the old module version please contact Dr. Schneider.

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- Lean Construction lecture/exercise: 60 h

according to selected courses or examinations respectively:

- Turnkey Construction lecture/exercise: 30 h
- Civil Engineering Structures and Regenerative Energies lecture/exercise: 30 h
- Site Management lecture: 15 h
- Energetic Refurbishment lecture: 15 h
- Project Management in Construction and Real Estate Industry I lecture, exercise: 30 h
- Project Management in Construction and Real Estate Industry II lecture, exercise: 30 h

independent study:

- preparation and follow-up lectures, exercises Lean Construction: 30 h
- preparation of project report Lean Construction (partial exam): 30 h
- examination preparation Lean Construction (partial exam): 60 h

according to selected courses or examinations respectively:

- preparation and follow-up lecture/exercises Turnkey Construction: 30 h
- examination preparation Turnkey Construction (partial exam): 30 h
- preparation and follow-up lecture/exercises Civil Engineering Structures and Regenerative Energies: 30 h
- examination preparation Civil Engineering Structures and Regenerative Energies (partial exam): 30 h
- preparation and follow-up lectures Site Management: 15 h
- examination preparation Site Management (partial exam): 15 h
- preparation and follow-up lectures Energetic Refurbishment: 15 h
- examination preparation Energetic Refurbishment (partial exam): 15 h
- preparation and follow-up lectures, exercises Project Management in Construction and Real Estate Industry I: 30 h
- examination preparation Project Management in Construction and Real Estate Industry I (partial exam): 30 h
- preparation and follow-up lectures, exercises Project Management in Construction and Real Estate Industry II: 30 h
- examination preparation Project Management in Construction and Real Estate Industry II (partial exam): 30 h

total: 270 h

Recommendation
It is recommend to take the module Fundamentals of construction [WI3INGBGU3] from the Bachelor's degree program.

Literature
Gehbauer, F. (2013) Lean Management Im Bauwesen. Skript des Instituts für Technologie und Management im Baubetrieb, Karlsruher Institut für Technologie (KIT).
Liker, J. & Meier, D. (2007) Praxisbuch, der Toyota Weg: für jedes Unternehmen. Finanzbuch Verlag.
Rother, M., Shook, J., & Wiegand, B. (2006). Sehen lernen: mit Wertstromdesign die Wertschöpfung erhöhen und Verschwendung beseitigen. Lean Management Institut.

M 6.69 Module: Logistics and Supply Chain Management [M-MACH-105298]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	English	4	2

Mandatory			
T-MACH-110771	Logistics and Supply Chain Management	9 CR	Furmans

Competence Certificate
The assessment consists of a 120 minutes written examination (according to §4(2), 1 of the examination regulation).

Prerequisites
None

Competence Goal
The student

- has comprehensive and well-founded knowledge of the central challenges in logistics and supply chain management, an overview of various practical issues and the decision-making requirements and models in supply chains,
- can model supply chains and logistics systems using simple models with sufficient accuracy,
- identifies cause-effect relationships in supply chains,
- is able to evaluate supply chains and logistics systems based on the methods they have mastered.

Content
Logistics and Supply Chain Management provides comprehensive and well-founded fundamentals for the crucial issues in logistics and supply chain management. Within the scope of the lectures, the interaction of different design elements of supply chains is emphasized. For this purpose, qualitative and quantitative description models are used. Methods for mapping and evaluating logistics systems and supply chains are also covered. The lecture contents are enriched by exercises and case studies and partially the comprehension of the contents is provided by case studies. The interacting of the elements will be shown, among other things, in the supply chain of the automotive industry.

Module grade calculation
grade of the module is grades of the exam

Workload
contact hours (1 HpW = 1 h x 15 weeks):

- lecture: 60 h

independent study:

- preparation and follow-up lectures: 90 h
- preparation of case studies: 60 h
- examination preparation: 60 h

total: 270 h

Recommendation
none

Learning type
Lectures, tutorials, case studies.

Literature
Knut Alicke: Planung und Betrieb von Logistiknetzwerken: Unternehmensübergreifendes Supply Chain Management, 2003

Dieter Arnold et. al.: Handbuch Logistik, 2008

Marc Goetschalkx: Supply Chain Engineering, 2011

M 6.70 Module: Machine Tools and Industrial Handling [M-MACH-101286]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	4	5

Mandatory			
T-MACH-110963	Machine Tools and High-Precision Manufacturing Systems	9 CR	Fleischer

Competence Certificate
Oral exam (45 minutes)

Prerequisites
None

Competence Goal
The students

- are able to assess the use and application of machine tools and high-precision manufacturing systems and to differentiate between them in terms of their characteristics and design.
- can describe and discuss the essential elements of machine tools and high-precision manufacturing systems (frame, main spindle, feed axes, peripheral equipment, control unit).
- are able to select and dimension the essential components of machine tools and high-precision manufacturing systems.
- are capable of selecting and evaluating machine tools and high-precision manufacturing systems according to technical and economic criteria.

Content
The module gives an overview of the construction, use and application of machine tools and high-precision manufacturing systems. In the course of the module a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools and high-precision manufacturing systems is conveyed. First, the main components of the systems are systematically explained and their design principles as well as the integral system design are discussed. Subsequently, the use and application of machine tools and high-precision manufacturing systems will be demonstrated using typical machine examples. Based on examples from current research and industrial applications, the latest developments are discussed, especially concerning the implementation of Industry 4.0 and artificial intelligence.
Guest lectures from industry round off the module with insights into practice.

The individual topics are:

- Structural components of dynamic manufacturing Systems
- Feed axes: High-precision positioning
- Spindles of cutting machine Tools
- Peripheral Equipment
- Machine control unit
- Metrological Evaluation
- Maintenance strategies and condition Monitoring
- Process Monitoring
- Development process for machine tools and high-precision manufacturing Systems
- Machine examples

Workload
regular attendance: 63 hours
self-study: 207 hours

Learning type
Lecture, exercise, excursio

M 6.71 Module: Major Field: Integrated Product Development [M-MACH-102626]

Responsible: Prof. Dr.-Ing. Albert Albers
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
18	Grade to a tenth	Each winter term	1 term	German	4	3

Mandatory			
T-MACH-105401	Integrated Product Development	18 CR	Albers

Competence Certificate
oral examination (60 minutes)

Prerequisites
None

Competence Goal
By working practically in experience-based learning arrangements with industrial development tasks, graduates are able to succeed in new and unknown situations when developing innovative products by using methodological and systematic approaches. They can apply and adapt strategies of development and innovation management, technical system analysis and team leadership to the situation. As a result, they are able to foster the development of innovative products in industrial development teams in prominent positions, taking into account social, economic and ethical aspects.

Content
Organizational integration: integrated product development model, core team management and simultaneous engineering, informational integration: innovation management, cost management, quality management and knowledge management

Personal integration: team development and leadership

Guest lectures from the industry

Annotation
The participation in the course "Integrated Product Development" requires the simultaneous participation in the lecture(2145156), the workshop (2145157) and the product development project (2145300).

For organizational reasons, the number of participants for the product development project is limited. Therefore, a selection process will take place. Registration for the selection process is made by means of a registration form, which is available annually from April to July on the homepage of the IPEK. Afterwards the selection itself will be discussed in personal interviews with Professor Albers.

The rule here is:

- Students within the course of studies will be decided on the basis of their progress (not only with semesters), which will be determined in a personal interview. The personal selection interviews take place in addition, in order to make the students aware of the special project-oriented format and the time required in correlation with the ECTS points of the course before the final registration for the course.
- With the same study progress after waiting period
- With same waiting time by lot.
- The same procedure is used for students from other courses.

Workload
The work load is about 480 hours, corresponding to 16 credit points.

Learning type
lecture
tutorial
product development project

M 6.72 Module: Management Accounting [M-WIWI-101498]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	English	4	3

Mandatory			
T-WIWI-102800	Management Accounting 1	4,5 CR	Wouters
T-WIWI-102801	Management Accounting 2	4,5 CR	Wouters

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
If the module has already been completed in the Bachelor's program, it may not be taken again in the Master's program.

Competence Goal
Students

- are familiar with various management accounting methods,
- can apply these methods for cost estimation, profitability analysis, and product costing,
- are able to analyze short-term and long-decisions with these methods,
- have the capacity to devise instruments for organizational control.

Content
The module consists of two courses "Management Accounting 1" and "Management Accounting 2". The emphasis is on structured learning of management accounting techniques.

Annotation
The following courses are part of this module:

- The course Management Accounting 1, which is offered in every sommer semester
- The course Management Accounting 2, which is offered in every winter semester

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.73 Module: Manufacturing Technology [M-MACH-101276]

Responsible: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	4	5

Mandatory			
T-MACH-102105	Manufacturing Technology	9 CR	Schulze

Competence Certificate
Written Exam (180 min)

Prerequisites
None

Competence Goal
The students

- can name different manufacturing processes, can describe their specific characteristics and are capable to depict the general function of manufacturing processes and are able to assign manufacturing processes to the specific main groups.
- are enabled to identify correlations between different processes and to select a process depending on possible applications.
- are capable to describe the theoretical basics for the manufacturing processes they got to know within the scope of the course and are able to compare the processes.
- are able to correlate based on their knowledge in materials science the processing parameters with the resulting material properties by taking into account the microstructural effects.
- are qualified to evaluate different processes on a material scientific basis.

Content
Within this engineering sciences-oriented module the students will get to learn principle aspects of manufacturing technology. Further information can be found at the description of the lecture "Manufacturing Technology".

Workload
regular attendance: 63 hours
self-study: 207 hours

Learning type
Lectures, exercise, excursion

M 6.74 Module: Market Engineering [M-WIWI-101446]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	9

Mandatory			
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CR	Weinhardt
Supplementary Courses (Election: 4,5 credits)			
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-113160	Digital Democracy	4,5 CR	Fegert
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CR	Weinhardt
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-111109	KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics	4,5 CR	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The students

- know the design criterias of market mechanisms and the systematic approach to create new markets,
- understand the basics of the mechanism design and auction theory,
- analyze and evaluate existing markets regarding the missing incentives and the optimal solution of a given market mechanism, respectively,
- develop solutions in teams.

Content
This module explains the dependencies between the design von markets and their success. Markets are complex interaction of different institution and participants in a market behave strategically according to the market rules. The development and the design of markets or market mechanisms has a strong influence on the behavior of the participants. A systematic approach and a thorough analysis of existing markets is inevitable to design, create and operate a market place successfully. the approaches for a systematic analysis are explained in the mandatory course *Market Engineering* [2540460] by discussing theories about mechanism design and institutional economics. The student can deepen his knowledge about markets in a second course.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.75 Module: Marketing and Sales Management [M-WIWI-105312]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	German/English	4	7

Compulsory Elective Courses (Election:)			
T-WIWI-112693	Digital Marketing	4,5 CR	Kupfer
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CR	Klarmann, Konhäuser
T-WIWI-110985	International Business Development and Sales	6 CR	Casenave , Klarmann, Terzidis
T-WIWI-111099	Judgement and Decision Making	4,5 CR	Scheibehenne
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-111848	Online Concepts for Karlsruhe City Retailers	3 CR	Klarmann
T-WIWI-102883	Pricing	4,5 CR	Klarmann
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- have an advanced knowledge about central marketing contents
- have a fundamental understanding of the marketing instruments
- know and understand several strategic concepts and how to implement them
- are able to implement their extensive marketing knowledge in a practical context
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the Marketing department

Content
The aim of this module is to deepen central marketing contents in different areas.

Workload
The total workload for this module is approximately 270 hours.

M 6.76 Module: Material Flow in Networked Logistic Systems [M-MACH-101278]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	6

Mandatory			
T-MACH-105189	Mathematical Models and Methods for Production Systems	6 CR	Baumann, Furmans
Material flow in interconnected logistics systems (Election:)			
T-MACH-112213	Applied material flow simulation	4,5 CR	Baumann
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Kramer, Schönung
T-MACH-111003	Global Logistics	4 CR	Furmans
T-MACH-102128	Information Systems and Supply Chain Management	3 CR	Kilger
T-MACH-105187	IT-Fundamentals of Logistics	4 CR	Thomas
T-MACH-105174	Warehousing and Distribution Systems	3 CR	Furmans
T-MACH-105175	Airport Logistics	3 CR	Richter
T-MACH-105171	Safety Engineering	4 CR	Kany

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- acquires in-depth knowledge on the main topics of logistics, gets an overview of different logistic questions in practice,
- is able to evaluate logistic systems by using the learnt methods,
- is able to analyze and explain the phenomena of industrial material and value streams.

Content
The module *Material Flow in networked Logistic Systems* provides in-depth basics for the main topics of logistics and industrial material and value streams. The obligatory lecture focuses on queuing methods to model production systems. To gain a deeper understanding, the course is accompanied by exercises.

Workload
Regular attendance: 270 hours (9 credits). Lectures with 180 hours attendance 6 credits. Lectures with 120 hours 4 credits.

Recommendation
It is recommended to successfully complete the course "Material Flow in Logistics Systems" [T-MACH-102151] before starting the module.

Learning type
Lecture, tutorial.

M 6.77 Module: Mathematical Programming [M-WIWI-101473]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Research
Compulsory Elective Modules (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	7

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-103638	Global Optimization I and II	9 CR	Stein
T-WIWI-102856	Convex Analysis	4,5 CR	Stein
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CR	Stein
T-WIWI-102855	Parametric Optimization	4,5 CR	Stein
Supplementary Courses (Election: at most 2 items)			
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-102727	Global Optimization II	4,5 CR	Stein
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CR	Grothe
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-102725	Nonlinear Optimization II	4,5 CR	Stein
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Mixed Integer Programming I", "Multicriteria Optimization", "Convex Analysis", "Parametric Optimization", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
The student

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous and mixed integer decision variables.

Annotation
The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload
The total workload for this module is approximately 270 hours.

M 6.78 Module: Microeconomic Theory [M-WIWI-101500]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	4

Compulsory Elective Courses (Election: at least 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-113264	Matching Theory	4,5 CR	Puppe
T-WIWI-102859	Social Choice Theory	4,5 CR	Puppe

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- are able to model practical microoeconomic problems mathematically and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs.

Here is an example of a positive question: what firm decisions does a specific regulatory policy result in under imperfect competition? An example of a normative question would be: which voting rule has appealing properties?

Content
The module teaches advanced concepts and content in microeconomic theory. Thematically, it offers a formally rigorous treatment of game theory and exemplary applications, such as strategic interaction on markets and non-/cooperative bargaining ("Advanced Game Theory"), as well as specialized courses dedicated to auctions ("Auktionstheorie") and incentive systems in organizations ("Incentives in Organizations"). Moreover, it offers the opportunity to delve deeper into the mathematical theory of voting and collective decision making, i.e. the systematic aggregation of preferences and judgments ("Social Choice Theory").

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.79 Module: Microfabrication [M-MACH-101291]

Responsible: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	3

Mandatory			
T-MACH-102166	Fabrication Processes in Microsystem Technology	3 CR	Bade
Mikrofertigung (Ergänzungsbereich) (Election: at least 6 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-100530	Physics for Engineers	6 CR	Dienwiebel, Gumbsch, Nesterov-Müller, Weygand
T-MACH-102167	Nanotribology and -Mechanics	3 CR	Dienwiebel, Hölscher
T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications	3 CR	Worgull
T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications	3 CR	Rapp
T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics	3 CR	Rapp, Worgull
T-MACH-105556	Practical Course Polymers in MEMS	3 CR	Rapp, Worgull
T-MACH-109122	X-ray Optics	4 CR	Last
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	4 CR	Last

Competence Certificate
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- gains advanced knowledge concerning fabrication techniques in micrometer scale
- aquires knowledge in up-to-date developing research
- can detect and use causal relation in microfabrication process chains.

Content
This engineering module allows the student to gain advanced knowledge in the area of microfabrication. Different manufacturing methods are described and analyzed in an advanced manner. Necessary interdisciplinary knowledge from physics, chemistry, materials science and also up-to-date developments (nano and x-ray optics) in micro fabrication is offered.

Workload
270 hours

M 6.80 Module: Microoptics [M-MACH-101292]

Responsible: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	4

Mikrooptik (Election: at least 9 credits)			
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-101910	Microactuators	3 CR	Kohl
T-ETIT-100741	Laser Physics	4 CR	Eichhorn
T-ETIT-101945	Optical Waveguides and Fibers	4 CR	Koos
T-MACH-109122	X-ray Optics	4 CR	Last
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	4 CR	Last

Competence Certificate
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- basic knowlegde for the applications of microoptical systems
- understanding fabrication processes of microoptical elements & systems
- analyzing strengths and weaknesses of lithography processes
- knowledge on the basics of optical sources and detectors and their use in technical systems
- fundamental knowledge on different lasers and their design
- knowlegde on X-ray imaging methodes

Content
Optical imaging, measuring and sensor systems are a base for modern natural sciences. In particular life sciences and telecommunications have an intrinsic need for the application of optical technologies. Numerous fields of physics and engineering, e.g. astronomy and material sciences, require optical techniques. Micro optical systems are introduced in medical diagnostics and biological sensing as well as in products of the daily life.

In this module, an introduction to the basics of optics is provided; optical effects are presented with respect to their technical use.

Optical elements and instruments are presented. Fabrication processes of micro optical systems and elements, in particular lithography, are discussed.

In addition X-ray optics and X-ray imaging systems are presented as well as elements of optical telecommunication. A closer look on the physics behind lasers, being one of the most important technical light sources, is provided. As high end technology and clean room equipment is present in all the lectures of this module, the students will have a hands-on training with several experiments in micro optics.

Workload
270 hours

M 6.81 Module: Microsystem Technology [M-MACH-101287]

Responsible: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	5

Mikrosystemtechnik (Election: at least 9 credits)			
T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	3 CR	Guber
T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	3 CR	Guber
T-MACH-105182	Introduction to Microsystem Technology I	3 CR	Badilita, Jouda, Korvink
T-MACH-105183	Introduction to Microsystem Technology II	3 CR	Jouda, Korvink
T-MACH-101910	Microactuators	3 CR	Kohl
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-ETIT-101907	Optoelectronic Components	4 CR	Freude
T-MACH-100530	Physics for Engineers	6 CR	Dienwiebel, Gumbsch, Nesterov-Müller, Weygand
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-111807	Introduction to Bionics	3 CR	Hölscher
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	4 CR	Last

Competence Certificate
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

Content
The module offers courses in microsystem technology. Knowledge is imparted in various fields like basics in construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

Workload
270 hours

M 6.82 Module: Mobile Machines [M-MACH-101267]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each winter term	2 terms	4	5

Mandatory			
T-MACH-105168	Mobile Machines	9 CR	Geimer
Mobile Machines (Election: at least 1 credit)			
T-MACH-105307	Drive Train of Mobile Machines	4 CR	Geimer, Wydra
T-MACH-105311	Design and Development of Mobile Machines	4 CR	Geimer, Siebert
T-MACH-108887	Design and Development of Mobile Machines - Advance	0 CR	Geimer, Siebert
T-MACH-102093	Fluid Power Systems	5 CR	Geimer
T-MACH-111389	Fundamentals in the Development of Commercial Vehicles	3 CR	Weber
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer
T-MACH-108888	Simulation of Coupled Systems - Advance	0 CR	Geimer, Xiang
T-MACH-111821	Control of Mobile Machines	4 CR	Becker, Geimer
T-MACH-111820	Control of Mobile Machines – Prerequisites	0 CR	Becker, Geimer

Competence Certificate
The assessment is carried out as a general oral exam (duration approx. 60 mins) (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

The overall grade of the module is the grade of the oral examination.

The assessment may be carried out as partial oral exams (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.In this case the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

The assessment procedures are described for each course of the module seperately.

Prerequisites
None

Competence Goal
The student

- knows and understands the basic structure of the machines
- masters the basic skills to develop the selected machines

Content
In the module of *Mobile Machines* [WI4INGMB15] the students will learn the structure of the machines and deepen the knowledge of the subject for developing the machines. After conclusion the module the student will know the latest developments in mobile machines and is able to evaluate the concepts and the trends of developments. The module is practically orientated and supported by industry partners.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Knowledge of Fluid Power Systems are helpful, otherwise it is recommended to take the course *Fluid Power Systems* [2114093].

M 6.83 Module: Modeling the Dynamics of Financial Markets [M-WIWI-106660]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	1 term	English	4	1

Mandatory			
T-WIWI-113414	Modeling the Dynamics of Financial Markets	9 CR	Ulrich

Competence Certificate
The module examination takes the form of a one-hour written comprehensive examination on the two courses "Dynamic Capital Market Theory" and "Essentials for Dynamic Financial Machine Learning".

Competence Goal
Dynamic Capital Market Theory:

Professional competence:

- Understanding of the principles of Dynamic Asset Pricing Theory
- Mastery of concepts such as stochastic calculus and dynamic modeling in discrete and continuous time
- Application of dynamic programming theory to portfolio and investment decisions
- Knowledge of pricing bonds, stocks, futures and options markets.

Interdisciplinary skills:

- Develop analytical skills for working on and solving complex problems in finance
- Ability to apply theoretical models to real financial market scenarios.

Essentials for Dynamic Financial Machine Learning:

Professional Competence:

- Competencies in Multivariate Time Series Modeling and Dynamic Volatility Modeling.
- Skills in dealing with big financial data.
- Knowledge in the estimation of risk premia and the application of Kalman Filtering.

Interdisciplinary skills:

- Analytical skills in applying machine learning algorithms to dynamic financial market data.
- Development of problem-solving skills through the practical application of Python in financial data analysis.

Content
Dynamic Capital Market Theory:

The course "Dynamic Capital Market Theory" offers an introduction to the modeling of dynamic capital markets. Portfolio holdings and asset prices move dynamically across time and states. This course teaches basic financial economic thinking to help understand why this is the case and how to optimally act in such environments.
Next to the asset pricing focus, the second focus of the course is on optimal portfolio choice (robo advisory). For that, this course develops the theory of dynamic programming in discrete and continuous time and applies it to solve portfolio choice and corporate investment decisions. These concepts are key for financial engineering and the machine learning branch of Reinforcement Learning.

Students obtain proficiency in the following topics:

- Dynamic Valuation and Optimal Dynamic Asset Allocation
- Dynamic modeling in discrete time and continuous time
- Stochastic Calculus
- Markov Decision Processes and Dynamic Programming in discrete time and continuous time
- Pricing of bonds, equity, futures and options

Lectures (2 SWS) develop all concepts on the whiteboard, while exercises are solved during weekly tutorials (2 SWS).

Essentials for Dynamic Financial Machine Learning:

The course "Essentials for Dynamic Financial Machine Learning" teaches students to work with financial data, algorithms and statistical concepts.
Students are exposed to algorithms to learn key quantities of dynamic capital markets, such as time-varying risk premia, time-varying volatility and unobserved realizations of random states. The course covers the following concepts:

- Multivariate time series modeling
- Dynamic volatility modeling
- Handling big financial data
- Estimating risk premia
- Kalman Filtering

Weekly lectures (2 SWS) develop all algorithmic material on the whiteboard. Weekly tutorials (2 SWS) solve and discuss Python solutions to selected problems.

Workload
Total workload for 9 credit points: approx. 270 hours. The exact distribution is based on the credit points of the courses in the module:

- Dynamic Capital Market Theory: 4.5 CP
- Essentials for Dynamic Financial Machine Learning: 4.5 CP

Recommendation
Recommendation: Knowledge in the fields of Advanced Statistics, Deep Learning, Financial Economics, Differential Equations, Optimization.

Learning type
The module consists of two weekly lectures and respective tutorials:

1. **Dynamic Capital Market Theory** and
2. **Essentials for Dynamic Financial Machine Learning**.

M 6.84 Module: Modern Mobility on Rails and Roads [M-MACH-106496]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	3	1

Modern Mobility on Rail and Road (Election: 2 items)			
T-MACH-113016	Digitization in the Railway System	4,5 CR	Cichon
T-MACH-113069	Vehicle Systems for Urban Mobility	4,5 CR	Cichon
T-MACH-113068	Innovation and Project Management in Rail Vehicle Engineering	4,5 CR	Cichon

M 6.85 Module: Module Master's Thesis [M-WIWI-101650]

Responsible: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: Master's Thesis

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
30	Grade to a tenth	Each term	1 term	German	4	2

Mandatory			
T-WIWI-103142	Master's Thesis	30 CR	Studiendekan der KIT-Fakultät für Informatik, Studiendekan des KIT-Studienganges

Competence Certificate
The Master's thesis is a written piece of work that demonstrates that the student is able to work on a problem from their subject in an academic manner. It is regulated in detail in § 14 SPO 2015.

At least two KIT examiners supervise and assess the work. At least one of the examiners must be a professor and usually an examiner at the Department of Economics and Management.

The regular completion period is six months. Upon justified request by the student, the Examination Board may extend the completion period by a maximum of three months. If the Master's thesis is not completed and submitted to the examiner by the deadline, it will be assessed as "insufficient", unless the candidate is not responsible for this failure (e.g. maternity leave). In addition to the written work on the topic, a presentation can be agreed as an obligatory and grade-relevant part of the thesis. Depending on the agreement, this can take place before submission or after submission on an agreed date. The preparation time for the presentation does not count towards the processing time for the written part, unless it has been included in the overall workload of the final project.

The thesis may be written in English with the consent of the examiner. Other languages require the consent of the examiner and the approval of the examination board.

The candidate may only return the topic of the Master's thesis once and only within the first month of registration.

If the thesis is not passed, it may be repeated once. A new topic must be issued. The same topic may not be repeated. This also applies to comparable topics. In case of doubt, the examination board will decide. The new topic may again be supervised by the examiners of the first thesis.

This regulation also applies analogously after an official withdrawal from a registered topic.

The module grade is the grade for the Master's thesis.

Prerequisites
Prerequisite for admission to the Master thesis is that 50 percent of the credit points has to be completed.

A written confirmation of the examinor about supervising the Master Thesis is required.

Please pay regard to the institute specific rules for supervising a Master Thesis.

The Master Thesis has to contain the following declaration in German:

„Ich versichere wahrheitsgemäß, die Arbeit selbstständig verfasst, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde sowie die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet zu haben“.

If this declaration is not given, the Master Thesis will not be accepted.

Competence Goal
The student can independently handle a complex and unfamiliar subject based on scientific criteria and on the current state of research.

He/she is in a position to critically analyze and structure the researched information as well as derive principles and regularities. He/she knows how to apply the thereby achieved results to solve the task at hand. Taking into account this knowledge and his/her interdisciplinary knowledge, he/she can draw own conclusions, derive improvement potentials, propose and implement science-based decisions.

This is basically also done under consideration of social and/or ethical aspects.

He/she can interpret, evaluate and if required, graphically present the obtained results.

He/she is in a position to sensibly structure a research paper, document them and clearly communicate the results in scientific form.

Content
The Master Thesis is a major scientific work. The topic of the Master Thesis will be chosen by the student themselves and adjusted with the examinor. The topic has to be related to Industrial Engineering and Management and has to refer to subject-specific or interdisciplinary problems.

Workload
A total of approx. 900 hours is expected for the preparation and presentation of the Master's thesis. In addition to writing the thesis, this figure includes all necessary activities such as literature research, familiarization with the topic, familiarization with any necessary tools, conducting studies/experiments, supervision meetings, etc.

M 6.86 Module: Nanotechnology [M-MACH-101294]

Responsible: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	4

Mandatory			
T-MACH-111814	Introduction to nanotechnology	4 CR	Hölscher
Nanotechnologie (Ergänzungsbereich) (Election: at least 5 credits)			
T-MACH-111807	Introduction to Bionics	3 CR	Hölscher
T-MACH-102167	Nanotribology and -Mechanics	3 CR	Dienwiebel, Hölscher
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-ETIT-100740	Quantum Functional Devices and Semiconductor Technology	3 CR	Koos
T-MACH-105555	System Integration in Micro- and Nanotechnology	4 CR	Gengenbach
T-MACH-105695	Selected topics of system integration for micro- and nanotechnology	4 CR	Gengenbach, Hagenmeyer, Koker, Sieber
T-MACH-108809	Micro- and Nanosystem Integration for Medical, Fluidic and Optical Applications	4 CR	Gengenbach, Koker, Sieber
T-MACH-110272	System Integration in Micro- and Nanotechnology 2	4 CR	Gengenbach
T-MACH-111030	Micro- and nanotechnology in implant technology	4 CR	Ahrens, Doll
T-PHYS-102282	Nano-Optics	8 CR	Naber
T-PHYS-102504	Simulation of Nanoscale Systems, without Seminar	6 CR	Wenzel
T-MACH-108312	Introduction to Microsystem Technology - Practical Course	4 CR	Last

Competence Certificate
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
The student

- has detailed knowledge in the field of nanotechnology
- is able to evaluate the specific characteristics of nanosystems.

Content
The module deals with the most important principles and fundamentals of modern nanotechnology. The compulsory module “Introduction to Nanotechnology” introduces the basics of nanotechnology and nanoanalytics. The specific phenomena and properties found in nanoscale systems are the main topic of the module.

Workload
270 hours

Learning type
Lectures

M 6.87 Module: Natural Hazards and Risk Management [M-WIWI-104837]

Responsible: apl. Prof. Dr. Michael Kunz
Organisation: KIT Department of Economics and Management
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	2

Compulsory Elective Courses (Election: at least 9 credits)			
T-BGU-101499	Introduction to Hydrogeology	5 CR	Goldscheider
T-BGU-108943	Engineering Hydrology	3 CR	Ehret
T-BGU-111275	Integrated Design Project in Water Resources Management	6 CR	Ehret, Seidel
T-BGU-101859	Morphodynamics	3 CR	Rodrigues Pereira da Franca
T-BGU-106620	Examination Prerequisite Environmental Communication	0 CR	Kämpf
T-BGU-101676	Environmental Communication	4 CR	Kämpf

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
See German version

Content
See German version

Annotation
Students, who successfully completed both modules “Understanding and Prediction of Disasters” I and II (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.88 Module: Network Economics [M-WIWI-101406]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	3

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102712	Regulation Theory and Practice	4,5 CR	Mitusch
T-WIWI-113147	Telecommunications and Internet – Economics and Policy	4,5 CR	Mitusch

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students

- have acquired the basic knowledge for a future job in a network company or in a regulatory agency, ministry etc.
- recognize the specific characterizations of network sectors, know fundamental methods for an economic analysis of network sectors and recognize the interfaces for an interdisciplinary cooperation of economists, engineers and lawyers
- understand the interactions between infrastructures, control systems, and the users of networks, especially concerning their implications on investments, price setting and competitive behavior, and they can model or simulate exemplary applications
- can assess the necessity of regulation of natural monopolies and identify regulatory measures that are important for networks.

Content
The module is concerned with network or infrastructure industries in the economy, e.g. telecommunication, traffic and energy sectors. These sectors are characterized by close interdependencies of operators and users of infrastructure as well as on states. States intervene in various forms, by the public and regulation authorities, due to the importance of network industries and due to limited abilities of markets to work properly in these industries. The students are supposed to develop a broad knowledge of these sectors and of the political options available.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

M 6.89 Module: Operations Research in Supply Chain Management [M-WIWI-102832]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Operations Research
Compulsory Elective Modules (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	8

Election notes
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
Supplementary Courses (Election: at most 1 item)			
T-MACH-112213	Applied material flow simulation	4,5 CR	Baumann
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Spieckermann
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

Competence Certificate
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and "Special Topics of Stochastic Optimization (elective)" has to be taken.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of SCM and their respective optimization problems,
- is acquainted with classical location problem models (in planes, in networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

This module considers several areas of SCM. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of Supply Chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of supply chain management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Mangement, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Annotation
Some lectures and courses are offered irregularly.

The planned lectures and courses for the next three years are announced online.

Workload
Total effort for 9 credits: ca. 270 hours

- Presence time: 84 hours
- Preparation/Wrap-up: 112 hours
- Examination and examination preparation: 74 hours

Recommendation
Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

M 6.90 Module: Optoelectronics and Optical Communication [M-MACH-101295]

Responsible: Prof. Dr. Jan Gerrit Korvink
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	2

Optoelektronik und Optische Kommunikationstechnik (Kernbereich) (Election: 1 item)			
T-ETIT-100639	Optical Transmitters and Receivers	6 CR	Freude
Optoelektronik und Optische Kommunikationstechnik (Ergänzungsbereich) (Election: at least 5 credits)			
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-ETIT-101938	Communication Systems and Protocols	5 CR	Becker, Becker
T-ETIT-100741	Laser Physics	4 CR	Eichhorn
T-ETIT-100740	Quantum Functional Devices and Semiconductor Technology	3 CR	Koos
T-ETIT-101945	Optical Waveguides and Fibers	4 CR	Koos

Competence Certificate
The assessment is carried out as partial exams

(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
none

Competence Goal
Student has basic knowledge of optical communication systems and related device and fabrication technologies.

- He/she can apply this knowledge to specific problems.

Content
This module covers practical and theoretical aspects in the areas of optical communications and optoelectronics. System aspects of communication networks are complemented by fundamental principles and device technologies of optoelectronics as well as and microsystem fabrication technologies.

Workload
270 hours

M 6.91 Module: Principles of Food Process Engineering [M-CIWVT-101120]

Responsible: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	2 terms	4	3

Principles of Food Process Engineerung (Election: 1 item)			
T-CIWVT-111536	Process Engineering: Example Food Processing	6 CR	Gaukel
T-CIWVT-100152	Advanced Food Processing	3 CR	Gaukel
Elective Courses: Food Process Engineering (Election: between 3 and 8 credits)			
T-CIWVT-112174	Extrusion Technology in Food Processing	4 CR	
T-CIWVT-108801	Food Science and Functionality	4 CR	Watzl

Prerequisites
none

Competence Goal
See German version.

M 6.92 Module: Private Business Law [M-INFO-101216]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	5

Private Business Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-111405	Seminar: Commercial and Corporate Law in the IT Industry	3 CR	Nolte
T-INFO-101288	Corporate Compliance	3 CR	Herzig
T-INFO-102036	Computer Contract Law	3 CR	Menk
T-INFO-111436	Employment Law	3 CR	Hoff
T-INFO-111437	Tax Law	3 CR	Dietrich

Prerequisites
None

Competence Goal
The student

- has gained in-depth knowledge of German company law, commercial law and civil law;
- is able to analyze, evaluate and solve complex legal and economic relations and problems;
- is well grounded in individual labour law, collective labour law and commercial constitutional law, evaluates and critically assesses clauses in labour contracts;
- recognizes the significance of the parties to collective labour agreements within the economic system and has differentiated knowledge of labour disputes law and the law governing the supply of temporary workers and of social law;
- possesses detailed knowledge of national earnings and corporate tax law and is able to deal with provisions of tax law in a scientific manner and assesses the effect of these provisions on corporate decision-making.

Content
The module provides the student with knowledge in special matters in business law, like employment law, tax law and business law, which are essential for managerial decisions.

M 6.93 Module: Process Engineering in Construction [M-BGU-101110]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-BGU-101844	Process Engineering	3 CR	Schneider
Electives (Election: between 2 and 3 items as well as between 6 and 7,5 credits)			
T-BGU-101845	Construction Equipment	3 CR	Gentes
T-BGU-101832	Operation Methods for Foundation and Marine Construction	1,5 CR	Schneider
T-BGU-101801	Operation Methods for Earthmoving	1,5 CR	Schlick
T-BGU-101846	Tunnel Construction and Blasting Engineering	3 CR	Haghsheno
T-BGU-101847	Project Studies	3 CR	Gentes
T-BGU-101850	Disassembly Process Engineering	3 CR	Gentes

Competence Certificate
- 'Teilleistung' T-BGU-101844 with written examination according to § 4 Par. 2 No. 1

according to selected course:

- 'Teilleistung' T-BGU-101845 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-101832 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101801 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101846 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101847 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-101850 with oral examination according to § 4 Par. 2 No. 2

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
The course Verfahrenstechnik [6241704] is compulsory and must be examined.

Competence Goal
Students understand different processes and the related construction equipment, it's technology, capabilities and constraints. Students can define process solutions consisting of machinery and devices. They can evaluate existing processes through knowledge about process performance and operating conditions, and the can identify potential for improvement.

Content
Within the frame of this module, various construction und conditioning processes will be presented as well as performance calculations conducted. Students learn about the construction machinery and devices of these processes. Transmission, generation, conversion and controlling of power are explained with the help of various practical examples. Moreover, the module includes possibilities for an on-site familiarization.

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
None

Workload
see German version

Recommendation
none

M 6.94 Module: Production Engineering [M-MACH-106590]

Responsible: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	2

Production Engineering (Election: at least 9 credits)			
T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry	4 CR	Wawerla
T-MACH-110991	Global Production	5 CR	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-112115	Artificial Intelligence in Production	5 CR	Fleischer
T-MACH-105783	Learning Factory "Global Production"	6 CR	Lanza
T-MACH-108878	Laboratory Production Metrology	5 CR	Lanza, Stamer
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-110984	Production Technology for E-Mobility	4 CR	Fleischer
T-MACH-110960	Project Internship Additive Manufacturing: Development and Production of an Additive Component	4 CR	Zanger
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-112121	Seminar Application of Artificial Intelligence in Production	4 CR	Fleischer
T-MACH-105185	Control Technology	4 CR	Gönnheimer
T-MACH-113372	Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation	4 CR	Benfer, Lanza
T-MACH-105177	Metal Forming	4 CR	Herlan
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber

Competence Certificate
Oral exams: duration approx. 5 min per credit point

Written exams: duration approx. 20 - 25 min per credit point

Amount, type and scope of the success control can vary according to the individually choice.

Prerequisites
The module M-MACH-101284 -Production Technology must not have been started.

Competence Goal
The students

- are able to apply the methods of production science to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Content
Within this module the students will get to know and learn about production science. Manifold lectures and excursions as part of several lectures provide specific insights into the field of production science.

Workload
The work load is about 270 hours, corresponding to 9 credit points.

Learning type
Lectures, seminars, workshops, excursions

M 6.95 Module: Project Management in Construction [M-BGU-101888]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	4	3

Election notes
The course Project Management in Construction and Real Estate Industry II is only allowed to be selected if the selectable course Project Management in Construction and Real Estate Industry I has been passed.

Mandatory			
T-BGU-103432	Project Management in Construction and Real Estate Industry I	3 CR	Haghsheno
T-BGU-111921	Turnkey Construction	3 CR	Haghsheno
Electives (Election: between 1 and 2 items as well as between 3 and 4,5 credits)			
T-BGU-103427	Site Management	1,5 CR	Haghsheno
T-BGU-111211	Energetic Refurbishment	1,5 CR	Lennerts, Schneider
T-BGU-111922	Civil Engineering Structures and Regenerative Energies	3 CR	Haghsheno
T-BGU-103433	Project Management in Construction and Real Estate Industry II	3 CR	Haghsheno

Competence Certificate
- 'Teilleistung' T-BGU-103432 with examination of other type according to § 4 Par. 2 No. 3
- 'Teilleistung' T-BGU-111921 with written examination according to § 4 Par. 2 No. 1

according to selected course:

- 'Teilleistung' T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111211 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-111922 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-103433 with examination of other type according to § 4 Par. 2 No. 3

details about the learning controls see at the respective 'Teilleistung'

Prerequisites
none

Competence Goal
see German version

Content
see German version

Module grade calculation
grade of the module is CP weighted average of grades of the partial exams

Annotation
As from summer term 2022 the selectable courses are partly replaced. With queries about the completion of the old module version please contact Dr. Schneider.

Workload
see German version

Recommendation
see German version

Literature

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M 6.96 Module: Public Business Law [M-INFO-101217]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	8

Public Business Law (Election: at least 1 item as well as at least 9 credits)			
T-INFO-101309	Telecommunications Law	3 CR	
T-INFO-101312	European and International Law	3 CR	Brühann
T-INFO-111404	Seminar: IT- Security Law	3 CR	Schallbruch
T-INFO-113381	Public International Law	3 CR	

Competence Certificate
see course description.

M 6.97 Module: Rail System Technology [M-MACH-101274]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	5

Mandatory			
T-MACH-102143	Rail System Technology	9 CR	Cichon

Competence Certificate
written examination in German language
Duration: 120 minutes
No tools or reference materials may be used during the exam except calculator and dictionary

Competence Goal

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- Based on operating requirements and legal framework they derive the requirements concerning a capable infrastructure and suitable concepts of rail vehicles.
- They recognize the impact of alignment, understand the important function of the wheel-rail-contact and estimate the impact of driving dynamics on the operating program.
- They evaluate the impact of operating concepts on safety and capacity of a rail system.
- They know the infrastructure to provide power supply to rail vehicles with different drive systems.
- The students learn the role of rail vehicles and understand their classification. They understand the basic structure und know the functions of the main systems. They understand the overall tasks of vehicle system technology.
- They learn functions and requirements of car bodies and jugde advantages and disadvantages of design principles. They know the functions of the car body's interfaces.
- They know about the basics of running dynamics and bogies.
- The students learn about advantages and disadvantages of different types of traction drives and judge, which one fits best for each application.
- They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems.
- They know the basic setup of train control management system and understand the most important functions.
- They specify and define suitable vehicle concepts based on requirements for modern rail vehicles.

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations
8. Vehicle system technology: structure and main systems of rail vehicles
9. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
10. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
11. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
12. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
13. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
14. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Annotation
A bibliography is available for download (Ilias-platform).

The lectures can be attended in the same term.

Workload

1. Regular attendance: 42 hours
2. Self-study: 42 hours
3. Exam and preparation: 186 hours

Learning type
Lectures

M 6.98 Module: Safety, Computing and Law in Highway Engineering [M-BGU-101066]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	German	4	2

Mandatory			
T-BGU-101804	IT-Based Road Design	3 CR	Zimmermann
T-BGU-101674	Safety Management in Highway Engineering	3 CR	Zimmermann
T-BGU-106615	Laws concerning Traffic and Roads	3 CR	Hönig

Prerequisites
The examination "Design Basics in Highway Engineering" has to be passed. This can be taken either in the module "Design, Construction, Operation and Maintenance of Highways" (WI4INGBGU1) or can be approved from a previous study (e.g. Civil Engineering BSc at KIT).

Competence Goal
See German version.

Annotation
None

Recommendation
None

M 6.99 Module: Seminar Module [M-WIWI-101808]

Responsible: Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	9

Election notes
Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.

Alternatively, one of the two seminars can be absolved at an engineering department.

Compulsory Seminars (Election: 2 items)			
T-WIWI-103474	Seminar in Business Administration A (Master)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103476	Seminar in Business Administration B (Master)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103477	Seminar in Economics B (Master)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103478	Seminar in Economics A (Master)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103479	Seminar in Informatics A (Master)	3 CR	Professorenschaft des Instituts AIFB
T-WIWI-103480	Seminar in Informatics B (Master)	3 CR	Professorenschaft des Instituts AIFB
T-WIWI-103481	Seminar in Operations Research A (Master)	3 CR	Nickel, Rebennack, Stein
T-WIWI-103482	Seminar in Operations Research B (Master)	3 CR	Nickel, Rebennack, Stein
T-WIWI-103483	Seminar in Statistics A (Master)	3 CR	Grothe, Schienle
T-WIWI-103484	Seminar in Statistics B (Master)	3 CR	Grothe, Schienle
T-INFO-101997	Seminar: Legal Studies I	3 CR	N.N.
T-INFO-105945	Seminar: Legal Studies II	3 CR	N.N.
T-MACH-102135	Conveying Technology and Logistics	3 CR	Furmans, Pagani
T-MACH-109062	Seminar Production Technology	3 CR	Fleischer, Lanza, Schulze
T-MACH-108737	Seminar Data-Mining in Production	3 CR	Lanza
T-ETIT-100754	Seminar Creating a Patent Specification	3 CR	Stork
T-WIWI-108763	Seminar in Engineering Science Master (approval)	3 CR	Fachvertreter ingenieurwissenschaftlicher Fakultäten
Interdisciplinary Qualifications (Election: at least 3 credits)			
T-WIWI-112967	Tutoring: Training and Practice *This item will not influence the grade calculation of this parent.*	2 CR	
T-WIWI-111438	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	1 CR	
T-WIWI-111439	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	2 CR	
T-WIWI-111440	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	3 CR	
T-WIWI-113353	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	2 CR	

T-WIWI-113352	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	1 CR	
T-WIWI-113354	Self-Booking-HOC-SPZ-ZAK-STK-Graded *This item will not influence the grade calculation of this parent.*	3 CR	
T-WIWI-111441	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	1 CR	
T-WIWI-111442	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	2 CR	
T-WIWI-111443	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	3 CR	
T-WIWI-113355	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	1 CR	
T-WIWI-113356	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	2 CR	
T-WIWI-113357	Self-Booking-HOC-SPZ-ZAK-STK-Ungraded *This item will not influence the grade calculation of this parent.*	3 CR	

Competence Certificate
The modul examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examintaion regulation). A detailed description of every singled assessment is given in the specific course characerization.

The final mark for the module is the average of the marks for each of the two seminars weighted by the credits and truncated after the first decimal. Grades of the KQ courses are not included.

Prerequisites
The course specific preconditions must be observed.

- *Seminars*: Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.
- Alternatively, one of the two seminars can be absolved at an engineering department. The seminar has to be offered by a representative of the respective department as well. The assessment has to meet the demands of the Department of Economics and Management (active participation, term paper with a workload of at least 80 h, presentation). This alternative seminar **requires an official approval** and can be applied at the examination office of the Department of Economics and Management. Seminars at the institutes wbk and IFL do not require these approval.
- *Key Qualification (KQ)-course(s)*: One or more courses with at least 3 CP in total of additional key qualifications have to be chosen among the courses [HoC, ZAK, Sprachenzentrum].

Competence Goal

- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.
- Students are familiar with the DFG´s Code of Conduct "Guidelines for Safeguarding Good Research Practice" and base their scientific work on it.

Content
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailled description o these qualifications is given in the section “Key Qualifications” of the module handbook.

Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
he total workload for this module is approximately 270 hours. For further information see German version.

M 6.100 Module: Sensor Technology I [M-ETIT-101158]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each summer term	1 term	4	3

Mandatory			
T-ETIT-101911	Sensors	3 CR	Menesklou
Compulsory Elective (Election: at most 2 items as well as at least 6 credits)			
T-ETIT-100707	Seminar Sensors	3 CR	Menesklou
T-MACH-101910	Microactuators	3 CR	Kohl
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-105182	Introduction to Microsystem Technology I	3 CR	Badilita, Jouda, Korvink
T-MACH-105183	Introduction to Microsystem Technology II	3 CR	Jouda, Korvink

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
The course *Sensor Technology* [23231] is obligatory and has to be attended. The elected courses must not be credited in other modules.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Knowledge of electrical engineering is assumed. Therefore it is recommended to attend the courses *Electrical Engineering II* [23224] beforehand.

M 6.101 Module: Service Analytics [M-WIWI-101506]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	9

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche
T-WIWI-112152	Practical Seminar: Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-109940	Special Topics in Information Systems	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Annotation
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
The course Service Analytics A [2595501] should be taken.

M 6.102 Module: Service Design Thinking [M-WIWI-101503]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	English	4	1

Mandatory			
T-WIWI-102849	Service Design Thinking	12 CR	Satzger, Terzidis

Competence Certificate
The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

Prerequisites
None

Competence Goal

- Deep knowledge of the innovation method Design Thinking, as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Learn to apply the method to a real innovation projects issued by industry partners.

Content

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (intern. Design Thinking network).
- Design Space Exploration: Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are in the focus of this phase.
- Funky Prototype: Integration of the individually tested and successful functions to several complete solution scenarios, which are further tested and developed.
- Functional Prototype: Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is lade out in detail and tested with users.
- Final Prototype: Implementing the functional prototype and presenting it to the customer.

Annotation
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

Workload
The total amount of work for this module is approx. 270 hours (9 credits). The workload for this course is comparably high as the course runs in cooperation with partner universities from around the world as well as partner companies. This causes overhead.

Recommendation
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

M 6.103 Module: Service Economics and Management [M-WIWI-102754]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	6

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CR	Satzger
T-WIWI-112823	Platform & Market Engineering: Commerce, Media, and Digital Democracy	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
Students

- understand the scientific basics of the management of digital services and corresponding systems
- gain a comprehensive insight in the importance and the most important features of information systems as an central component of the digitalization of business processes, products and services
- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully
- understand the OR methods in the sector of service management and apply them adequately
- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems
- are able to develop market-oriented coordination mechanisms and apply service systems.

Content
This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

Annotation
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.104 Module: Service Innovation, Design & Engineering [M-WIWI-102806]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Gerhard Satzger

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	5

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CR	Satzger
T-WIWI-113460	Engineering Interactive Systems: AI & Wearables	4,5 CR	Mädche
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-113459	Practical Seminar: Human-Centered Systems	4,5 CR	Mädche
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
Dependencies between courses:

The course Practical Seminar Service Innovation cannot be applied in combination with the course Practical Seminar Digital Service Design.

Competence Goal
Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.
- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.
- are able to embed the concepts of innovation management, development and design of services into organisations
- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation
- elaborate concrete and problem-solving solutions for practical tasks in teams.

Content
This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

Annotation
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].

Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

M 6.105 Module: Service Management [M-WIWI-101448]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	11

Compulsory Elective Courses (Election: 9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-111219	Artificial Intelligence in Service Systems - Applications in Computer Vision	4,5 CR	Satzger
T-WIWI-112757	Digital Services: Innovation & Business Models	4,5 CR	Satzger

Competence Certificate
The assessment is carried out as partial exams, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The students

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- systematically use vast amounts of available data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

Content
The module service management addresses the basics of developing and managing IT-based services. The lectures contained in this module teach the basics of developing and managing IT-based services and the application of OR methods in the field of service management. Moreover, students learn to systematically analyze vast amounts of data for planning, operation and improvement for complex service offerings. These tools enhance operational and strategic decision support and help to analyze and understand the overall innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

Annotation
From summer semester 2023, the course Service Innovation will be offered with a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Current foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
None

M 6.106 Module: Service Operations [M-WIWI-102805]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Operations Research
Compulsory Elective Modules (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	7

Election notes
At least one of the fourcourses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management orDiscrete-Event Simulation in Production and Logistics has to be assigned.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Compulsory Elective Courses (Election: at most 2 items)			
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Spieckermann
T-WIWI-102884	Operations Research in Health Care Management	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-102716	Practical Seminar: Health Care Management (with Case Studies)	4,5 CR	Nickel
Supplementary Courses (Election: at most 1 item)			
T-MACH-112213	Applied material flow simulation	4,5 CR	Baumann
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr
T-WIWI-110971	Demand-Driven Supply Chain Planning	4,5 CR	Packowski

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the four courses "Operations Research in Supply Chain Management", "Operations Research in Health Care Management", "Practical seminar: Health Care Management" or "Discrete-Event Simulation in Production and Logistics" has to be assigned.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data "Big Data" and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Annotation
This module is part of the KSRI teaching profile "Digital Service Systems". Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

Recommendation
The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.

M 6.107 Module: Sociology [M-GEISTSOZ-101169]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	2 terms	4	2

Mandatory			
T-GEISTSOZ-104565	Computer Aided Data Analysis	0 CR	Nollmann
T-GEISTSOZ-109052	Application of Social Science Methods (WiWi)	9 CR	Nollmann

Prerequisites
Students must pass three excersise sheets within the seminar "Computer based data analysis".

Competence Goal
The student

- Gains theoretical and methodical knowledge of social processes and structures,
- learns a script based data analysis tool (R, Stata, Python),
- gathers his/her data within an own framework and/or analyzes complex data,
- is able to present his/her work results in a precise and clear way.

Content
The Sociology module offers students the opportunity to learn a data analysis tool (R, Stata, Python) within the framework of a two-semester course and to independently transfer this tool to a content-related question. Both the tool and the contents are determined by the lecturers. The contents can refer to the analysis of large population surveys (SOEP, Microcensus, ALLBUS), to own experiments, to own field studies or to Big Data analyses.

Annotation
Basic knowledge in multivariate regression and inference statistics is required.

M 6.108 Module: Specialization in Food Process Engineering [M-CIWVT-101119]

Responsible: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	3

Elective Courses: Specialization in Food Process Engineering (Election: at least 9 credits)			
T-CIWVT-111433	Drying of Dispersions	1,5 CR	Karbstein
T-CIWVT-108871	Microbiology for Engineers	3 CR	Schwartz
T-CHEMBIO-109442	Food Chemistry Basics	3 CR	Bunzel
T-CIWVT-111434	Additives and Active Substances	1,5 CR	van der Schaaf
T-CIWVT-111534	Introduction to Sensory Analysis with Practice	1,5 CR	Scherf
T-CIWVT-111535	Food Science and Functionality	3 CR	Watzl
T-CHEMBIO-108091	Introduction to Food Law	1,5 CR	Kuballa
T-CIWVT-112174	Extrusion Technology in Food Processing	4 CR	

Competence Goal
The students

- can explain and apply engineering fundamentals of process engineering
- Know and understand various specific aspects of food processing and can apply their basic knowledge to the specifics of food processing/ to the professional practice of food processing.

Content
See courses.

M 6.109 Module: Specific Topics in Materials Science [M-MACH-101268]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German	4	3

Spezielle Werkstoffkunde (Election: at least 9 credits)			
T-MACH-102141	Constitution and Properties of Wearresistant Materials	4 CR	Ulrich
T-MACH-105150	Constitution and Properties of Protective Coatings	4 CR	Ulrich
T-MACH-102099	Experimental Lab Class in Welding Technology, in Groups	4 CR	Dietrich
T-MACH-105179	Functional Ceramics	4 CR	Hinterstein, Rheinheimer
T-MACH-105157	Foundry Technology	4 CR	Wilhelm
T-MACH-102111	Principles of Ceramic and Powder Metallurgy Processing	4 CR	Schell
T-MACH-100287	Introduction to Ceramics	6 CR	Schell
T-MACH-102182	Ceramic Processing Technology	4 CR	Binder
T-MACH-105164	Laser in Automotive Engineering	4 CR	Schneider
T-MACH-112763	Laser Material Processing	4 CR	Schneider
T-MACH-102102	Physical Basics of Laser Technology	5 CR	Schneider
T-MACH-102137	Polymer Engineering I	4 CR	Liebig
T-MACH-102138	Polymer Engineering II	4 CR	Liebig
T-MACH-102154	Laboratory Laser Materials Processing	4 CR	Schneider
T-MACH-105178	Practical Course Technical Ceramics	4 CR	Schell
T-MACH-102157	High Performance Powder Metallurgy Materials	4 CR	Schell
T-MACH-105170	Welding Technology	4 CR	Farajian
T-MACH-102170	Structural and Phase Analysis	4 CR	Wagner
T-MACH-102103	Superhard Thin Film Materials	4 CR	Ulrich
T-MACH-100531	Systematic Materials Selection	4 CR	Dietrich, Schulze
T-MACH-102139	Failure of Structural Materials: Fatigue and Creep	4 CR	Gruber, Gumbsch
T-MACH-102140	Failure of Structural Materials: Deformation and Fracture	4 CR	Gumbsch, Weygand

Competence Certificate
The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

Prerequisites
None

Competence Goal
Students acquire special basic knowledge in selected areas of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
See courses.

Module grade calculation
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Workload
The module requires an average workload of 270 hours.

Learning type
Lecture, Tutorials.

M 6.110 Module: Stochastic Optimization [M-WIWI-103289]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: Operations Research
Compulsory Elective Modules (Operations Research)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	10

Compulsory Elective Courses (Election: between 1 and 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
Supplementary Courses (Election: at most 1 item)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-111247	Mathematics for High Dimensional Statistics	4,5 CR	Grothe
T-WIWI-111587	Multicriteria Optimization	4,5 CR	Stein
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-106545	Optimization under Uncertainty	4,5 CR	Rebennack
T-WIWI-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-112109	Topics in Stochastic Optimization	4,5 CR	Rebennack

Competence Certificate
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
At least one of the courses "Advanced Stochastic Optimization", "Large-scale Optimization" or "Introduction to Stochastic Optimization" has to be taken.

If the module is taken as an elective, no compulsory courses need to be taken. If you take the module in the compulsory elective area and only want to complete courses from the supplementary offer, please contact the examination office of the KIT Department of
Economics and Management.

Competence Goal
The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,
- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Content
The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

Annotation
The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

Recommendation
It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

M 6.111 Module: Strategic Design of Modern Production Systems [M-MACH-105455]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	2

Strategic Design of Modern Production Systems (Election: at least 9 credits)			
T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry	4 CR	Wawerla
T-MACH-110991	Global Production	5 CR	Lanza
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-105783	Learning Factory "Global Production"	6 CR	Lanza
T-MACH-110318	Product- and Production-Concepts for Modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-113372	Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation	4 CR	Benfer, Lanza

Competence Certificate
Oral exams: duration approx. 5 min per credit point

Written exams: duration approx. 20 - 25 min per credit point

Amount, type and scope of the success control can vary according to the individually choice.

Prerequisites
none

Competence Goal
The students

- are able to apply the methods of the strategic design of modern production systems to new problems.
- are able to outline the underlying conditions and influencing factors of today's production and derive recommendations for action for an integrated strategy.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Content
Within this module the students will get to know and learn about methods for the strategic design of modern production systems. Manifold lectures and excursions as part of several lectures provide specific insights into the field of science.

Workload
The work load is about 270 hours, corresponding to 9 credit points.

Learning type
Lectures, seminars, workshops, excursions

M 6.112 Module: Student Innovation Lab (SIL) 1 [M-WIWI-105010]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	2 terms	English	4	1

Mandatory			
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
T-WIWI-110166	SIL Entrepreneurship Project	3 CR	Terzidis
T-WIWI-110287	SIL Entrepreneurship Emphasis	3 CR	Terzidis

Competence Certificate
The assessment of this module comprises a written examination of 60 minutes on the lecture contents of the lecture "Entrepreneurship" as well as two seminars. All examinations are graded. In both seminars the following tasks have to be fulfilled:

- "SIL Entrepreneurship Project": Presentation of the Value Profile & submission of the Business Plan
- "SIL Entrepreneurship Emphasis": Submission of price calculation, market potential analysis, competition analysis, financial plan, risk analysis, decision basis for funding and legal form

In addition, both courses provide for smaller, ungraded tasks to monitor progress.

The grade consists of 60 % of the written examination, 20 % of the examination "SIL Entrepreneurship Project" and 20 % of the examination "SIL Entrepreneurship Advanced".

Prerequisites
The module can only be completed together with the module M-WIWI-105011 "Student Innovation Lab 2".

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.

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Competence Goal
Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
  Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
- Conflict ability: Students can recognise conflicts at an early stage, analyse conflict situations and name solution concepts.

Innovation and Entrepreneurship Competence

- Agile product development: Students can apply methods of agile product development such as Scrum.
  Methodical innovation finding: Students can perform user- or technology-centric innovation processes to develop sustainable value propositions for dedicated target groups (e.g. Design Thinking (DT), Technology Application Selection (TAS) process).
- Orientation on the management of new technology-based companies (NTBF): Students can name the central concepts of intellectual property and legal form. Students can name the most important tasks of entrepreneurial leadership. They can identify the relevant forms of business modelling and draw up a business plan. Students know the central approaches to building an organisation. Students will be able to identify the ownership structure of investments and how to develop a strategy. The students can name marketing concepts and create a business model.
- Create investment readiness: The students are able to create a rudimentary sales and cost planning. Furthermore, they are able to create a project plan for a company and derive an investment plan from it. The students can present the business plan to potential investors and develop investor empathy.
- Business model development competence: Students are able to use relevant tools for business modelling, e.g. the Business Model Canvas. Students can develop and evaluate alternative business models.
- Dealing with risks:Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

- Problem-solving competence: Students can analyse, assess and solve a technical problem in a structured way.
- Agile Methodology of System Development: Students can name the different system development processes and apply them appropriately.
- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Content
In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one's own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

- As an innovation platform, the Automation Innovation Lab offers flying robots for cooperative swarm solutions.
- The Industry 4.0 Innovation Lab enables innovations in the area of the next industrial revolution with mobile robot platforms.
- In the Internet of Things Innovation Lab, innovations in Assisted Living and Smart Housing are made possible by a comprehensive kit of mobile robots and sensors.
- The Computer Vision for Health Lab offers a selection of state-of-the-art imaging devices and powerful computing hardware for innovative image-based applications for medicine and healthcare.

The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module. The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

M 6.113 Module: Student Innovation Lab (SIL) 2 [M-WIWI-105011]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr. Werner Nahm
Prof. Dr.-Ing. Eric Sax
Prof. Dr. Wilhelm Stork
Prof. Dr. Orestis Terzidis
Prof. Dr.-Ing. Thomas Zwick

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Business Administration)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a third	Each winter term	2 terms	English	4	1

Mandatory			
T-ETIT-110291	Innovation Lab	9 CR	Hohmann, Nahm, Sax, Stork, Zwick

Competence Certificate
The examination in this module comprises the submission of graded intermediate results in the form of prototypes (low fidelity and high fidelity) as well as various technical and economic reports (according to § 4 (2), 3 SPO):

1. Submission of a technical report with requirements list and system architectur
2. Submission of the reflection of the gate plans
3. Presentation of the High-fidelity

The module grade consists of 50% of the evaluation of the low fidelity prototype including intermediate results of a technical and economic nature and 50% of the evaluation of the high fidelity prototype including intermediate results of a technical and economic nature.

Prerequisites
The module can only be completed together with the module M-WIWI-105010 "Student Innovation Lab (SIL) 1".

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.

Competence Goal
Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
  Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
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Innovation and Entrepreneurship Competence

- Agile product development: Students can apply methods of agile product development such as Scrum.
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- Orientation on the management of new technology-based companies (NTBF): Students can name the central concepts of intellectual property and legal form. Students can name the most important tasks of entrepreneurial leadership. They can identify the relevant forms of business modelling and draw up a business plan. Students know the central approaches to building an organisation. Students will be able to identify the ownership structure of investments and how to develop a strategy. The students can name marketing concepts and create a business model.
- Create investment readiness: The students are able to create a rudimentary sales and cost planning. Furthermore, they are able to create a project plan for a company and derive an investment plan from it. The students can present the business plan to potential investors and develop investor empathy.
- Business model development competence: Students are able to use relevant tools for business modelling, e.g. the Business Model Canvas. Students can develop and evaluate alternative business models.
- Dealing with risks:Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

- Problem-solving competence: Students can analyse, assess and solve a technical problem in a structured way.
- Agile Methodology of System Development: Students can name the different system development processes and apply them appropriately.
- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Content
In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one's own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

- As an innovation platform, the Automation Innovation Lab offers flying robots for cooperative swarm solutions.
- The Industry 4.0 Innovation Lab enables innovations in the area of the next industrial revolution with mobile robot platforms.
- In the Internet of Things Innovation Lab, innovations in Assisted Living and Smart Housing are made possible by a comprehensive kit of mobile robots and sensors.
- The Computer Vision for Health Lab offers a selection of state-of-the-art imaging devices and powerful computing hardware for innovative image-based applications for medicine and healthcare.

The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Annotation
New module starting winter term 2019/2020.

Workload
The module comprises a total of 270 hours (8 hours attendance time, 213 hours preparation and follow-up time, 49 hours preparation time for examination), which corresponds to a total of 9 credit points for two semesters.

M 6.114 Module: Technical Logistics [M-MACH-101279]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	4	4

Mandatory			
T-MACH-109919	Basics of Technical Logistics I	4 CR	Mittwollen, Oellerich
T-MACH-109920	Basics of Technical Logistics II	6 CR	Furmans

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the requirement of credits of this module. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

T-MACH-109920 "Basics of Technical Logistics II" is based on T-MACH-109919 "Basics of Technical Logistics I". The contents are taught one after the other in one course in the winter semester. The individual exams are taken on one day at the end of the semester.

Prerequisites
none

Competence Goal
The student

- acquires well-founded knowledge on the main topics of technical logistics
- gets an overview of different applications of technical logistics in practice,
- acquires expertise and understanding about functionality of material handling systems.

Content
The module *Technical Logistics* provides in-depth basics on the main topics of technical logistics. The module focuses on technical characteristics of material handling technology. To gain a deeper understanding, the course is accompanied by exercises.

Workload
270 hours

Learning type
Lecture

M 6.115 Module: Transport Infrastructure Policy and Regional Development [M-WIWI-101485]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Economics
Compulsory Elective Modules (Economics)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	2

Compulsory Elective Courses (Election: 2 items)			
T-WIWI-103107	Spatial Economics	4,5 CR	Ott
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students

- understand the economic issues related to transport and regional development with a main focus on economic policy issues generated by the relationship of transport and regional development with the public sector
- are able to compare different considerations of politics, regulation and the private sector and to analyse and assess the respective decision problems both qualitatively and by applying appropriate methods from economic theory
- are prepared for careers in the public sector, particularly for public companies, politics, regulatory agencies, related consultancies, mayor construction companies or infrastructure project corporations

Content
The development infrastructure (e.g. transport, energy, telecommunications) has always been one of the most relevant factors for economic development and particularly influences the development of the regional economy. From the repertoire of state actions, investments into transport infrastructure are often regarded the most important measure to foster regional economic growth. Besides the direct effects of transport policy on passenger and freight transport, a variety of individual economic activities is significantly dependent on the available or potential transport options. Decisions on the planning, financing and realization of mayor infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs.

Through its combination of lectures the module reflects the complex interdependencies between infrastructure policy, transport industry and regional policy and provides its participants with a comprehensive understanding of the functionalities of one of the most important sectors of the economy and its relevance for economic policy.

Annotation
The courses *Assessment of Public Policies and Projects I* (winter term) and *Assessment of Public Policies and Projects II* (summer term) will no longer be part of this module. Student who have already had exams in this courses can integrate these exams in this module.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 6.116 Module: Transportation Modelling and Traffic Management [M-BGU-101065]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German/English	4	6

Compulsory Examination (Election: between 2 and 3 items as well as between 6 and 9 credits)			
T-BGU-101797	Methods and Models in Transportation Planning	3 CR	Vortisch
T-BGU-101798	Traffic Engineering	3 CR	Vortisch
T-BGU-101799	Traffic Management and Transport Telematics	3 CR	Vortisch
T-BGU-101800	Traffic Flow Simulation	3 CR	Vortisch
Electives (Election: at most 1 item as well as between 0 and 3 credits)			
T-BGU-100010	Transportation Data Analysis	3 CR	Kagerbauer
T-BGU-106611	Freight Transport	3 CR	Chlond
T-BGU-106301	Long-Distance and Air Traffic	3 CR	Chlond
T-BGU-101005	Tendering, Planning and Financing in Public Transport	3 CR	Vortisch
T-BGU-100014	Seminar in Transportation	3 CR	Chlond, Vortisch
T-BGU-112552	Seminar on Modeling and Simulation in Transportation	3 CR	Kagerbauer, Vortisch
T-BGU-103425	Mobility Services and New Forms of Mobility	3 CR	Kagerbauer
T-BGU-103426	Strategic Transport Planning	3 CR	Waßmuth
T-BGU-106608	Information Management for Public Mobility Services	3 CR	Vortisch
T-BGU-111057	Sustainability in Mobility Systems	3 CR	Kagerbauer

Prerequisites
None

Competence Goal
See German version.

Recommendation
None

M 6.117 Module: Urban Water Technologies [M-BGU-104448]

Responsible: Dr.-Ing. Mohammad Ebrahim Azari Najaf Abad
PD Dr.-Ing. Stephan Fuchs
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each summer term	2 terms	English	4	3

Mandatory			
T-BGU-112365	Urban Water Technologies	9 CR	Azari Najaf Abad, Fuchs

Prerequisites
none

Recommendation
none

M 6.118 Module: Vehicle Development [M-MACH-101265]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	1 term	German/English	4	8

Vehicle Development (Election: at least 9 credits)			
T-MACH-102207	Tires and Wheel Development for Passenger Cars	3 CR	Leister
T-MACH-111389	Fundamentals in the Development of Commercial Vehicles	3 CR	Weber
T-MACH-105162	Fundamentals of Automobile Development I	1,5 CR	Frech
T-MACH-105163	Fundamentals of Automobile Development II	1,5 CR	Frech
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, Gauterin, Gießler
T-MACH-110796	Python Algorithm for Vehicle Technology	4 CR	Rhode
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer
T-MACH-108888	Simulation of Coupled Systems - Advance *This item will not influence the grade calculation of this parent.*	0 CR	Geimer, Xiang
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber
T-MACH-112126	Data-Driven Algorithms in Vehicle Technology	4 CR	Scheubner

Competence Certificate
The assessment is carried out as partial exams.

The partial exams consists of a written exam (90 to 120 minutes) or an oral exam (duration 30 to 40 minutes).

Prerequisites
None

Competence Goal
The student

- knows and understands the procedures in automobile development,
- knows and understands the technical specifications at the development procedures,
- is aware of notable boundaries like legislation.

Content
By taking the module Vehicle Development the students get to know the methods and processes applied in the automobile industry. They learn the technical particularities which have to be considered during the vehicle development and it is shown how the numerous single components cooperate in a harmoniously balanced complete vehicle. There is also paid attention on special boundary conditions like legal requirements.

Workload
The total work load for this module is about 270 Hours (9 Credits). The partition of the work load is carried out according to the credit points of the courses of the module. The work load for courses with 6 credit points is about 180 hours, for courses with 4.5 credit points about 135 hours, for courses with 3 credit points about 90 hours, and for courses with 1.5 credit points about 45 hours. The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam duration and the time that is required to achieve the objectives of the module as an average student with an average performance.

Recommendation
Knowledge of the content of the courses *Engineering Mechanics I* [2161238], *Engineering Mechanics II* [2162276] and *Basics of Automotive Engineering I* [2113805], *Basics of Automotive Engineering II* [2114835] is helpful.

Learning type
The teaching and learning procedures (lecture, lab course, workshop) are described for each course of the module separately.

M 6.119 Module: Virtual Engineering A [M-MACH-101283]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	6

Mandatory			
T-MACH-102123	Virtual Engineering I	4 CR	Ovtcharova
Virtual Engineering A (Election: at least 5 credits)			
T-MACH-102185	CATIA CAD Training Course	2 CR	Ovtcharova
T-MACH-105312	CATIA Advanced	4 CR	Ovtcharova
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-106743	IoT Platform for Engineering	4 CR	Ovtcharova
T-MACH-102181	PLM for Product Development in Mechatronics	4 CR	Eigner
T-MACH-106740	Virtual Engineering Lab	4 CR	Ovtcharova
T-MACH-106741	Virtual Training Factory 4.X	4 CR	Ovtcharova
T-MACH-111285	Virtual Solution Methods and Processes	4 CR	Maier, Ovtcharova

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
None

Competence Goal
The students should:

- have basic knowledge about the industrial application of Information Technology in product development,
- have understanding about current and future application of information systems in product development processes in the context of Product Lifecycle Management and Virtual Engineering,
- be able to operate current CAx- and PLM-systems in the product development process
- understands demands and relevance of interconnected IT-systems and respective methods for product development

Content
The Module Virtual Engineering A gives an overview about product development processes, beginning with requirement engineering, verification of manufacturing feasibility and virtual operation in the scope of Digital Factory. The guest-lectures contained in this module complete the content of the lecture with introducing current product development processes focusing.

Workload

- regular attendance: 140 hours
- Preparation and reworking: 20 hours
- Exam and exam revision/preparation: 110 hours

Learning type
Lecture, exercise

M 6.120 Module: Virtual Engineering B [M-MACH-101281]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	4	6

Mandatory			
T-MACH-102124	Virtual Engineering II	4 CR	Ovtcharova
Virtual Engineering B (Election: at least 5 credits)			
T-MACH-102185	CATIA CAD Training Course	2 CR	Ovtcharova
T-MACH-105312	CATIA Advanced	4 CR	Ovtcharova
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-106743	IoT Platform for Engineering	4 CR	Ovtcharova
T-MACH-102181	PLM for Product Development in Mechatronics	4 CR	Eigner
T-MACH-106740	Virtual Engineering Lab	4 CR	Ovtcharova
T-MACH-106741	Virtual Training Factory 4.X	4 CR	Ovtcharova
T-MACH-111285	Virtual Solution Methods and Processes	4 CR	Maier, Ovtcharova

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Prerequisites
keine

Competence Goal
The students should:

- have basic knowledge about industrial practice of Information Technology in the field of product development,
- have basic knowledge about innovative visualization techniques like Virtual Reality and feasible application of Virtual Mock-Ups (VMU) for validating product properties.
- Is able to estimate potentials and risks of current Virtual Reality Systems in product development.
- understands demands and relevance of interconnected IT-systems and respective methods for product development

Content
The module Virtual Engineering B communicates basics of Virtual Reality applications and their fields of application for validating product properties and for supporting product development processes.

Optional courses of this module complete the content with practical application of VR techniques in product development (Virtual Reality Exercise) and current product development processes.

Workload
Workload at 9 graduate credits / credit points: ca. 270 hours.

- regular attendance: 100 hours
- Preparation and reworking: 50 hours
- Exam and exam revision/preparation: 120 hours

Detailed apportionment results from credit points of the courses of the module

Learning type
Lecture, Exercise.

M 6.121 Module: Water Chemistry and Water Technology I [M-CIWVT-101121]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German/English	4	2

Mandatory			
T-CIWVT-106802	Water Technology	6 CR	Horn
T-CIWVT-106840	Practical Course in Water Technology	3 CR	Abbt-Braun, Hille-Reichel, Horn
T-CIWVT-110866	Excursions: Water Supply	1 CR	Abbt-Braun, Horn

Prerequisites
none

Competence Goal
Students learn fundamental knowledge in water chemistry and how to apply it to processes in aquatic systems in general and in reactors for water treatment. Water treatment will be taught for drinking water and partly waste water. The students are able to apply physical, chemical and biochemical treatment for the respective removal of particulate and dissolved components in water. They are able to use the fundamental design parameters for the different types of unit operations.

Students can explain the most important processes in water treatment. They are able to do calculations, and to compare and interpret data. They learn how to use different methods, and to interpret different processes.

Content
Water cycle, different types of raw water (ground and surface water). Water as solvent, carbonate balance, differentiation between microbiological and chemical population. Unit operations: sieving, sedimentation, filtration, flocculation, flotation, ion exchange, aeration, oxidation, disinfection, adsorption). For all unit operations design parameters will be provided. Simple 1D models will be discussed for description of kinetics and retention time in reactors for water treatment.

6 different experiments out of: equilibrium study of the calcium carbonate system, flocculation, adsorption, oxidation, atomic absorption spectroscopy, ion chromatography, liquid chromatography, sum parameter, and an oral presentation of the student. In addition, excursions to two different treatment plants (waste water, drinking water)

Literature

- Crittenden, J. C. et al. (2012): Water treatment, principles and design. 3. Auflage, Wiley & Sons, Hoboken.
- Jekel, M., Czekalla, C. (Hrsg.) (2016). DVGW Lehr- und Handbuch der Wasserversorgung. Deutscher Industrieverlag.
- Harris, D. C., Lucy, C. A. (2019): Quantitative chemical analysis, 10. Auflage. W. H. Freeman and Company, New York.
- Patnaik, P., 2017: Handbook of environmental analysis: Chemical pollutants in air, water, soil, and solid wastes. CRC Press.
- Wilderer, P. (Ed., 2011): Treatise on water science, four-volume set, 1st edition, volume 3: Aquatic chemistry and biology. Elsevier, Oxford.
- Lecture notes will be provided in ILIAS

M 6.122 Module: Water Chemistry and Water Technology II [M-CIWVT-101122]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Grading scale	Recurrence	Duration	Level	Version
9	Grade to a tenth	Each term	2 terms	4	2

Mandatory			
T-CIWVT-108841	Water Quality Assessment	6 CR	Abbt-Braun
T-CIWVT-110864	Excursions: Membrane Technologies	1 CR	Horn, Saravia
T-CIWVT-110865	Membrane Technologies in Water Treatment	5 CR	Horn, Saravia

Prerequisites
The Module "Water Chemistry and Water Technology I" must be passed.

Competence Goal
The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- is able to explain the interrelationships of the occurrence of geogenic and anthropogenic substances as well as of microorganisms in the different areas of the hydrological cycle and is able to select suitable analytical methods for their determination,
- knows about the different types of water treatment and water purification methods to convert, reduce or concentrate water constituents, especially for membrane processes,
- is able to use methodical tools, analyze the correlations and critically evaluate the
critically evaluate the different procedures.

Content
The types of water, water law, basic terms of water chemical analysis, analysis quality, sampling, rapid test procedures and general investigation methods as well as summary parameters are dealt with. The analytical methods for main and secondary constituents as well as for organic and inorganic trace substances are discussed with examples for orientation.
The effects of the different treatment and purification methods are shown and it is explained how they can convert, reduce or concentrate water constituents.

7 Courses

T 7.1 Course: Additives and Active Substances [T-CIWVT-111434]

Responsible: Dr.-Ing. Ulrike van der Schaaf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each summer term	1

Events					
ST 2024	2211210		1 SWS	Lecture / ✕	van der Schaaf
Exams					
ST 2024	7220031	Additives and active substances			van der Schaaf

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

T 7.2 Course: Advanced Corporate Finance [T-WIWI-113469]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2530214	Advanced Corporate Finance	2 SWS	Lecture / 🗣	Ruckes
Exams					
ST 2024	7900073	Advanced Corporate Finance			Ruckes

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102622 - Corporate Financial Policy must not have been started.

Below you will find excerpts from events related to this course:

V Advanced Corporate Finance

2530214, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course covers the foundational principles of advanced topics of corporate finance, such as corporate governance, executive compensation, strategy & finance, mergers & acquisitions (M&A), and sustainable finance. Additionally, the course explores the respective institutional aspects within these areas of corporate finance. The approach is holistic, including both theoretical-conceptional aspects (e.g., moral hazard and the influence of asymmetric information) and empirical insights (e.g., the effects of financial decisions on firm value). Throughout, the course will emphasize both fundamental and current research findings.

Learning outcomes:

Upon successful completion of the course, students will possess profound knowledge and skills in advanced areas of corporate finance. These areas include topics such as corporate governance, executive compensation, strategy and finance, mergers and acquisitions (M&A), as well as key aspects of sustainable finance. Participants of this course will be able to describe and analyze the theoretical and conceptual foundations of the effects of information asymmetries and moral hazard on corporate financing behavior and assess their impact in corporate practice. Furthermore, upon completion of the course, participants will be familiar with the fundamental institutional elements in these areas and be able to discuss and solve advanced problems in corporate finance from both a theoretical and an empirical perspective. Moreover, students will acquire an advanced understanding of the central scientific findings in these topic areas, which will enable them to critically apply them in scientific and practical contexts.

Literature
Verschiedene Literaturquellen, u.a. Brealey/Myers/Allen/Edmans: Principles of Corporate Finance; Thomson/Conyon: Corporate Governance: Mechanisms and Systems; Larcker/Tayan: Corporate Governance Matters. Weitere Literatur wird in der Lehrveranstaltung bekannt gegeben.

Various source of literature, among others Brealey/Myers/Allen/Edmans: Principles of Corporate Finance; Thomson/Conyon: Corporate Governance: Mechanisms and Systems; Larcker/Tayan: Corporate Governance Matters. Additional reading materials will be introduced during the course.

T 7.3 Course: Advanced Empirical Asset Pricing [T-WIWI-110513]

Responsible: TT-Prof. Dr. Julian Thimme
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2530601	Übung zu Advanced Empirical Asset Pricing	1 SWS	Practice / 🏵	Thimme
WT 23/24	2530602	Advanced Empirical Asset Pricing	2 SWS	Lecture / 🏵	Thimme
Exams					
WT 23/24	7900319	Advanced Empirical Asset Pricing			Thimme

Legend: 🖥 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break. If the number of participants is low, an oral examination may also be offered. The examination is offered every semester and can be repeated at any regular examination date.

A bonus can be acquired by submitting exercise solutions to 80% of the assigned exercise tasks. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Recommendation
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course. In addition, prior participation in the Asset Pricing Master course is strongly recommended.

Annotation
New course from winter semester 2019/2020.

Below you will find excerpts from events related to this course:

V Advanced Empirical Asset Pricing

2530602, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this course we will discuss the fundamentals of Asset Pricing and how to test them. Although this is an Empirical Asset Pricing course, we deal with some concepts from Asset Pricing Theory that we can test afterwards (CAPM, ICAPM, CCAPM, recursive utility). Besides, the course will cover the most important empirical methods to do so. For that purpose, we will discuss the overarching tool *Generalized Method of Moments*, and the special cases of OLS and FMB regressions. Every second week, we will meet for a programing session, in which we will look at the data to draw our own conclusions. An introduction to the software MATLAB will be given at the beginning of the course. Students should bring a laptop to these sessions. Programing skills are not required but helpful.

We start with a review of the Stochastic Discount Factor, which is already known from the course „Asset Pricing“. We then derive the CAPM and the Consumption-CAPM as special cases from the general consumption-savings optimization problem of the rational investor. In the first part of the course we discuss the CAPM and, as natural extensions, models with multiple factors. Prominent phenomena such as the value premium and momentum are discussed. In the second part of the lecture we will study extensions of Consumption-CAPM and study the implications of exotic preferences.

Organizational issues
Die Veranstaltung findet mittwochs um 8:00-09:30 im Raum 001 im Geb. 40.28) statt und endet nach ersten Semesterhälfte.

Literature
Basisliteratur

Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

zur Vertiefung/ Wiederholung

Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.

The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

T 7.4 Course: Advanced Food Processing [T-CIWVT-100152]

Responsible: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2211111	Vertiefung verfahrenstechnischer Grundlagen am Beispiel Lebensmittel	2 SWS	Lecture / 🗣	Gaukel
Exams					
WT 23/24	7220004	Advanced Food Processing			Gaukel
ST 2024	7220004	Advanced Food Processing			Gaukel

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.5 Course: Advanced Game Theory [T-WIWI-102861]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2521533	Advanced Game Theory	2 SWS	Lecture / 🗣	Reiß
WT 23/24	2521534	Übung zu Advanced Game Theory	1 SWS	Practice / 🗣	Reiß, Peters
Exams					
WT 23/24	7910001	Advanced Game Theory			Reiß

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Basic knowledge of mathematics and statistics is assumed.

Below you will find excerpts from events related to this course:

V **Advanced Game Theory** — **Lecture (V) On-Site**
2521533, WS 23/24, 2 SWS, Language: English, Open in study portal

T 7.6 Course: Advanced Lab Blockchain Hackathon (Master) [T-WIWI-111126]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 23/24	2512403	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course /	Sunyaev, Kannengießer, Sturm, Beyene
Exams					
WT 23/24	7900141	Advanced Lab Blockchain Hackathon (Master)			Sunyaev
ST 2024	7900172	Lab Blockchain Hackathon (Master)			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

T 7.7 Course: Advanced Lab Informatics (Master) [T-WIWI-110548]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 23/24	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course /	Oberweis, Toussaint, Schiefer, Schüler
WT 23/24	2512401	Practical Course Sociotechnical Information Systems Development (Master)	3 SWS	Practical course /	Sunyaev, Goram, Leiser
WT 23/24	2512403	Advanced Lab Blockchain Hackathon (Bachelor)		Practical course /	Sunyaev, Kannengießer, Sturm, Beyene
WT 23/24	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course /	Zöllner, Daaboul
WT 23/24	2512600	Project lab Information Service Engineering (Master)	3 SWS	Practical course /	Sack
ST 2024	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course /	Schiefer, Schüler, Toussaint
ST 2024	2512207	Lab Automation in Everyday Life (Master)	3 SWS	Practical course /	Oberweis, Forell, Frister, Rybinski, Schiefer
ST 2024	2512401	Advanced Lab Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course /	Sunyaev, Leiser
ST 2024	2512403	Advanced Lab Blockchain Hackathon (Master)		Practical course /	Sunyaev, Sturm, Kannengießer, Beyene
ST 2024	2512500	Project Lab Machine Learning	3 SWS	Practical course /	Daaboul, Zöllner, Schneider
ST 2024	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Mayer, Berens, Mossano, Hennig, Veit, Länge

Exams			
WT 23/24	7900102	Advanced Lab Information Service Engineering (Master)	Sack
WT 23/24	7900107	Advanced Lab Cognitive Automobile and Robots (Master)	Zöllner
WT 23/24	7900141	Advanced Lab Blockchain Hackathon (Master)	Sunyaev
WT 23/24	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)	Sunyaev
WT 23/24	7900304	Seminar Linked Data and the Semantic Web (Master)	Käfer
WT 23/24	7900306	Advanced Lab Realization of Innovative Services (Master)	Oberweis
WT 23/24	7900307	Advanced Lab Security, Usability and Society (Master)	Volkamer
ST 2024	7900020	Lab Automation in Everyday Life (Master)	Oberweis
ST 2024	7900086	Project Lab Machine Learning	Zöllner
ST 2024	7900148	Advanced Lab Realization of innovative services (Master)	Oberweis
ST 2024	7900172	Lab Blockchain Hackathon (Master)	Sunyaev
ST 2024	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)	Sunyaev

ST 2024	7900178	Practical Lab Security, Usability and Society (Master)	Volkamer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Annotation
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Lab Realisation of innovative services (Master)**
2512205, WS 23/24, 3 SWS, Language: German, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V **Practical Course Cognitive automobiles and robots (Master)**
2512501, WS 23/24, 3 SWS, Language: German/English, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to courses such as "Machine Learning 1/2".
Scientific topics, mostly in the area of autonomous driving and robotics, will be addressed in joint work with ML/KI methods. The goal of the internship is for participants to design, develop, and evaluate ML Software system.

In addition to the scientific goals, such as the study and application of methods, the aspects of project-specific teamwork in research (from specification to presentation of results) are also worked on in this internship.

The individual projects require the analysis of the set task, selection of appropriate methods, specification and implementation and evaluation of the solution approach. Finally, the selected solution is to be documented and presented in a short lecture.

Learning Objectives:

- Students will be able to practically apply theoretical knowledge from lectures on machine learning to a selected area of current research.
- Students will be proficient in analyzing and solving thematic problems.
- Students will be able to evaluate, document, and present their concepts and results.

Recommendations:

- Theoretical knowledge of machine learning and/or AI.
- Python knowledge
- Initial experience with deep learning frameworks such as PyTorch/Jax/Tensorflow may be beneficial.

Workload:

The workload of 5 credit points consists of practical implementation of the selected solution, as well as time for literature research and planning/specification of the selected solution. In addition, a short report and presentation of the work performed will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Project lab Information Service Engineering (Master)

2512600, WS 23/24, 3 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
The ISE project lab is based on the summer semester lecture "Information Service Engineering". Goal of the course is to work on a given research problem in small groups (3-4 students) related to the ISE lecture topics, i.e. Natural Language Processing, Knowledge Graphs, and Machine Learning. The solution of the given research problem requires the development of a software implementation.

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

Required coursework includes:

- Mid term presentation (5-10 min)
- Final presentation (10-15 min)
- Course report (c. 20 pages)
- Participation and contribution of the students during the course
- Software development and delivery

Notes:

The ISE project lab can also be credited as a **seminar** (if necessary).

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

Participation will be restricted to 16 students.

Participation in the lecture "Information Service Engineering" (summer semester) is required. There are video recordings on our youtube channel.

ISE Tutor Team:

- Dr. Genet Asefa Gesese
- M. Sc. Mirza Mohtasim Alam
- M. Sc. Oleksandra Bruns
- M. Sc. Ebrahim Norouzi
- M. Sc. Mary Ann Tan
- B. Sc. Tabea Tietz
- M. Sc. Mahsa Vafaie

WS 2023/24 Tasks List:

- **Task 1: Zero-shot Ultrafine Typing of Named Entities.** Use Pre-trained Language Models to assign predefined labels to entity mentions in a given context. Evaluate approaches which require no training data on a standard benchmark, i.e. UFET
- **Task 2: Object Detection on Historical Theatre Photographs.** Use Pre-trained DL models to detect and identify objects in historical theatre photographs and integrate the results into an existing Knowledge Graph.
- **Task 3: Automatically Generate Ontologies from Competency Questions using Language Models**. Competency questions (CQs) define the scope of knowledge represented in an ontology and are used to evaluate an ontology based on its ability to answer each question. In this task, we are investigating the benefit of Large Language Models to generate and evaluate ontologies from a set of competency questions.
- **Task 4: Boosting the Performance of Large Language Models for Question Answering with Knowledge Graph Integration**. Often, large language models hallucinate users with wrong or confusing answers. In order to generate relevant answers, knowledge graphs can help in many ways. The goal of this task is to utilize a knowledge graph to provide context and factual information to a language model, thereby improving the relevance and accuracy of its responses.
- **Task 5:Information Extraction and Knowledge Graph Engineering on the Use Case of Historical Political Flyers**
  Information extraction and Knowledge Graph construction from digitized political leaflets of the Weimar Republic.
- **Task 6: Sentiment Analysis on Multilingual Wikipedia.** Analyse how different language Versions of Wikipedia differ in terms of Sentiment Bias.
- of a Knowledge Graph from 1.3 Mio Archival Objects from the German Digital Library

Literature
ISE video channel on youtube: https://www.youtube.com/channel/UCjkkhNSNuXrJpMYZoeSBw6Q/

V Lab Realisation of innovative services (Master)

2512205, SS 2024, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).

Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V Lab Automation in Everyday Life (Master)

2512207, SS 2024, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
As part of the lab, various topics on everyday automation are offered. During the lab, the participants will gain an insight into problem-solving oriented project work and work on a project together in small groups.

Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V Advanced Lab Development of Sociotechnical Information Systems (Master)

2512401, SS 2024, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

V Project Lab Machine Learning

2512500, SS 2024, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Praktikum Security, Usability and Society (Master)

2512555, SS 2024, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Online

Content
The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

Application deadline 12.04.2024
Assignment 15.04.2024
Confirmation deadline 19.04.2024

Important dates:

Kick-off: 17.04.2024, 09:00 AM CET in Big Blue Button - Link

Report & code feedback deadline: 26.07.2024, 23:59 CET
Feedback on Report & code: 16.08.2024, 23:59 CET
Final report + code deadline: 01.09.2024, 23:59 CET

Presentation draft deadline: 06.09.2024, 23:59 CET
Feedback on presentation draft: 13.09.2024, 23:59 CET
Final presentation deadline: 17.09.2024, 23:59 CET

Presentation day: 18.09.2024, 09:00 CET

Topics:

Privacy Friendly Apps

In this area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php . Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: NoPhish App
Number of students: 2 Ba/Ma
Description: The NoPhish app was one of the first measures from the NoPhish concept. The app has been around for a long time and has not been updated since then. Accordingly, the task of the project is to make the app functional for the current Android version. The app is also to be optimised so that updates, e.g. new chapters, can be added easily.

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: Hacking TORPEDO
Number of students: 1-2 Ba/Ma
Description: TORPEDO has existed for many years both as a Thunderbird add-on and as a web extension. TORPEDO is intended to help address various forms of phishing attacks and thereby protect the user, e.g. against various manipulations of the domain or additional tooltips. However, no targeted attacks on TORPEDO have yet been found. The aim of the work is to subject TORPEDO to a stress test and also to develop attacks that specifically target the implementation of TORPEDO.

Title: Making e-mails more visible by embedding moving images
Number of students: 1 Ma
Description: In case of a security incident, it is necessary to inform the affected persons about their vulnerabilities as soon as possible. Within the context of the INSPECTION project, we are currently informing website owners via e-mail about security related vulnerabilities on their websites. Although e-mails have been shown to be the most cost-efficient means to deliver such information, they have not lead to an appropriate remediation rate. While speaking to the affected website owners we learned that they would appreciate more information, although not being delivered as more text in the e-mail. Also, we learned that most e-mails were not read because they were considered spam. Thus, we need to find a way to make e-mail notifications more effective in raising peoples' awareness. Videos have been proven effective to raise awareness in the context of IT security. The goal of the project will be, to explore ways to embed videos in an e-mail via HTML (either as gifs or as preview to a YouTube video). The challenge is to make this e-mail readable for different clients and webmail as well as getting it delivered through spam filters.

Designing Security User studies

These topics are related to how to set up and conduct user studies of various types. Online studies, interviews and lab studies are possible. At the end of the semester, the students present a report / paper and a talk in which they present their methodologies and the results of small pre-studies.

Title: Usability of Password Managers in Virtual Reality
Number of students: 2 Ma
Description: The pre-dominant form of authentication in Virtual Reality (VR) are passwords. Passwords create a burden for users in the VR environment because of special input methods and the virtual keyboard [Stephenson, S. et al (2022). SoK: Authentication in Augmented and Virtual Reality]. Password Managers (PMs) can support the user with handling this problem [Mayer, P. et al. (2022). Why Users (Don't) Use Password Managers at a Large Educational Institution]. They offer auto-filling features, store credentials in an overview or generate complex and secure passwords. Especially in the VR context, where typing a password is slow and complex, PMs can be beneficial. We want to explore the different PMs in VR and test the usability to find challenges and possible solutions.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyse the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Visualization of Eye Gaze Patterns during Authetication Tasks
Number of students: 1 Ba/Ma
Description: In this project, students will analyze and visualize eye gaze data collected during two specific authentication tasks: the Dot Task and the Slider Task. The primary objective is to represent subjects' eye movements visually, enhancing the understanding of gaze patterns during the authentication process. *Dot Task Visualization:* For the Dot Task, participants were instructed to focus on a sequence of dots displayed on a screen. The dataset includes the positions of these dots and the corresponding gaze locations of the subjects. The student's task is to create a dynamic visualization that not only represents these positions accurately but also illustrates the sequence in which the dots were focused on by the subjects. *Slider Task Visualization:* The Slider Task involved presenting participants with a series of images, for which both the images' locations on the screen and the subjects' gaze locations are recorded. The challenge is to develop a heatmap visualization based on this data, effectively demonstrating the concentration and dispersion of gaze points across different images.

Title: How do website owners become aware that their website was hacked?
Number of student: 1 Ma
Description:

Title: Phishing through homographic attacks in messengers and social networks
Number of students: 1-2 Ba/Ma
Description: The task will be to test three types of attacks in messengers and social networks that work in some email clients. First is the link mismatch attack, where the link text differs from the actual link target. Second is an attack in which the actual link target is disguised by URL encoding [https://en.wikipedia.org/wiki/URL_encoding], and finally homographic attacks which uses Internationalized Domain Names [https://en.wikipedia.org/wiki/IDN_homograph_attack], in which Latin characters are replaced by characters of a different alphabet in the domain name. The attacks are predefined, so no knowledge of phishing techniques is required.

Title: Usability Study of Mobile Authentication for Elderly Users with Rheumatoid Arthritis (English only)
Number of students: 1 Ba/Ma
Description: Authentication is an ever important topic, especially in the mobile context. However, it becomes even more relevant when considering accessibility to it. Nowadays, a common authentication method is using a PIN. Yet, given the low hand mobility of users affected by rheumatoid arthritis, sometimes using PINs can be difficult. In this topic, the student will conduct several sessions of an already designed lab study with various participants using arthritis simulation gloves to evaluate three PIN-pad interfaces aimed at making authentication more accessible. The study will also investigate the preferences of users regarding PIN-pad interfaces through drawings and proposals of changes. The student will then analyse the results through inferential statistics. Depending on the quality of the outcome, the results will then be published in a paper and the student will be added to the authors list.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website (https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

T 7.8 Course: Advanced Lab Realization of Innovative Services (Master) [T-WIWI-112914]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 23/24	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course / 🧩	Oberweis, Toussaint, Schiefer, Schüler
ST 2024	2512205	Lab Realisation of innovative services (Master)	3 SWS	Practical course / 🗣	Schiefer, Schüler, Toussaint
Exams					
WT 23/24	7900306	Advanced Lab Realization of Innovative Services (Master)			Oberweis
ST 2024	7900148	Advanced Lab Realization of innovative services (Master)			Oberweis

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Annotation
As part of the lab, the participants should work together in small groups to produce innovative services (mainly for students).
Further information can be found on the ILIAS page of the lab.

Below you will find excerpts from events related to this course:

V Lab Realisation of innovative services (Master)

2512205, WS 23/24, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).
Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

V Lab Realisation of innovative services (Master)

2512205, SS 2024, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students).
Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

T 7.9 Course: Advanced Lab Security [T-WIWI-109786]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	2

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

T 7.10 Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	see Annotations	2

Events					
WT 23/24	2512554	Praktikum Security, Usability and Society (Bachelor)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Länge, Mossano, Hennig, Hilt, Veit
WT 23/24	2512555	Praktikum Security, Usability and Society (Master)	3 SWS	Practical course /	Volkamer, Strufe, Berens, Länge, Mossano, Hennig, Hilt, Veit
ST 2024	2512554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course /	Volkamer, Strufe, Mayer, Berens, Mossano, Hennig, Veit, Länge
Exams					
WT 23/24	7900116	Advanced Lab Security, Usability and Society (Bachelor)			Volkamer
WT 23/24	7900307	Advanced Lab Security, Usability and Society (Master)			Volkamer
ST 2024	7900029	Practical lab Security, Usability and Society (Bachelor)			Volkamer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

Annotation
The course will not be offered in the summer semester 2023.

Below you will find excerpts from events related to this course:

V **Praktikum Security, Usability and Society (Bachelor)** **Practical course (P)**
2512554, WS 23/24, 3 SWS, Language: German/English, Open in study portal **Online**

Content
The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have already been assigned.

There are two rounds to apply:

Summer round closes on 16.07.2023. Assignment will be done by 17.07.2023 and confirmation must be received by 21.07.2023.
Autumn round opens 11.09.2023 and closes on 08.10.2023. Assignment will be done by 09.10.2023 and confirmation must be received by 13.10.2023.

Important dates:

Kick-off: 05.10.2023, 09:00 AM CET in Big Blue Button - Link

Report & code feedback deadline: 01.03.2024, 23:59 CET
Feedback on Report & code: 08.03.2024, 23:59 CET
Final report + code deadline: 15.03.2024, 23:59 CET

Presentation draft deadline: 15.03.2024, 23:59 CET
Feedback on presentation draft: 19.03.2024, 23:59 CET
Final presentation deadline: 22.03.2024, 23:59 CET

Presentation day: 29.03.2024, 09:00 CET

Topics:

Privacy Friendly apps

In this subject, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php . Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: *Notes 2.0*
Number of students: 1 Bachelor
Description: Update und Vorbereitung zur Veröffentlichung der Notes 2.0-App.

Designing Security User studies

These topics are related to how to set up and conduct user studies of various types. Online studies, interviews and lab studies are possible. At the end of the semester, the students present a report / paper and a talk in which they present their methodologies and the results of small pre-studies.

Title: Designing User Studies for Evaluating Biometric Authentication Systems
Number of students: 1 Bachelor or Master level
Description: The proposed topic focuses on designing and implementing a user study methodology to evaluate the usability and user perception of biometric authentication systems. Biometric authentication involves using unique physiological or behavioral characteristics, such as fingerprints, facial recognition, or voice patterns, to verify a user's identity. The goal of this research is to understand the factors that affect the effectiveness and acceptance of biometric authentication and provide insights for designing user-friendly and secure biometric authentication systems.

Title: How useful are security advice given by ChatGPT?
Number of students: 1-2 Bachelor level
Description: ChatGPT is nowadays used for multiple reasons. One of them is to obtain advice on security decision, asking the program how to be best defend oneself. However, what are these advice based on? And more importantly, is the quality of the advice in line with the best practices or are they misleading? The goal of this topic is to design an expert study where various advice given by ChatGPT on security topics (e.g., password policies, phishing, etc.) are compared against the advice of experts. The results then need to be analysed and classified to determine the quality of ChatGPT advice.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyse the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Phishing through homographic attacks in messengers and social networks
Number of students: 1-2 Bachelor or Master level
Description: The task will be to test three types of attacks in messengers and social networks that work in some email clients. First is the link mismatch attack, where the link text differs from the actual link target. Second is an attack in which the actual link target is disguised by URL encoding [https://en.wikipedia.org/wiki/URL_encoding], and finally homographic attacks which uses Internationalized Domain Names [https://en.wikipedia.org/wiki/IDN_homograph_attack], in which Latin characters are replaced by characters of a different alphabet in the domain name. The attacks are predefined, so no knowledge of phishing techniques is required.

Title: Usability Study of Mobile Authentication for Elderly Users with Rheumatoid Arthritis (English only)
Number of students: 1 Bachelor or Master level
Description: Authentication is an ever important topic, especially in the mobile context. However, it becomes even more relevant when considering accessibility to it. Nowadays, a common authentication method is using a PIN. Yet, given the low hand mobility of users affected by rheumatoid arthritis, sometimes using PINs can be difficult. In this topic, the student will conduct several sessions of an already designed lab study with various participants using arthritis simulation gloves to evaluate three PIN-pad interfaces aimed at making authentication more accessible. The study will also investigate the preferences of users regarding PIN-pad interfaces through drawings and proposals of changes. The student will then analyse the results through inferential statistics. Depending on the quality of the outcome, the results will then be published in a paper and the student will be added to the authors list.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website (https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V **Praktikum Security, Usability and Society (Master)** **Practical course (P)**
2512555, WS 23/24, 3 SWS, Language: German/English, Open in study portal **Online**

Content
The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have been already assigned.

There are two deadlines:

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Autumn round opens 11.09.2023 and closes on 08.10.2023. Assignment will be done by 09.10.2023 and confirmation must be received by 13.10.2023.

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Presentation draft deadline: 15.03.2024, 23:59 CET
Feedback on presentation draft: 19.03.2024, 23:59 CET
Final presentation deadline: 22.03.2024, 23:59 CET

Presentation day: 29.03.2024, 09:00 CET

Topics:

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: Making e-mails more visible by embedding moving images
Number of students: 1 Master
Description: In case of a security incident, it is necessary to inform the affected persons about their vulnerabilities as soon as possible. Within the context of the INSPECTION project, we are currently informing website owners via e-mail about security related vulnerabilities on their websites. Although e-mails have been shown to be the most cost-efficient means to deliver such information, they have not lead to an appropriate remediation rate. While speaking to the affected website owners we learned that they would appreciate more information, although not being delivered as more text in the e-mail. Also, we learned that most e-mails were not read because they were considered spam. Thus, we need to find a way to make e-mail notifications more effective in raising peoples' awareness. Videos have been proven effective to raise awareness in the context of IT security. The goal of the project will be, to explore ways to embed videos in an e-mail via HTML (either as gifs or as preview to a YouTube video). The challenge is to make this e-mail readable for different clients and webmail as well as getting it delivered through spam filters.

Designing Security User studies

These topics are related to how to set up and conduct user studies of various types. Online studies, interviews and lab studies are possible. At the end of the semester, the students present a report / paper and a talk in which they present their methodologies and the results of small pre-studies.

Title: Designing User Studies for Evaluating Biometric Authentication Systems
Number of students: 1 Bachelor or Master level
Description: The proposed topic focuses on designing and implementing a user study methodology to evaluate the usability and user perception of biometric authentication systems. Biometric authentication involves using unique physiological or behavioral characteristics, such as fingerprints, facial recognition, or voice patterns, to verify a user's identity. The goal of this research is to understand the factors that affect the effectiveness and acceptance of biometric authentication and provide insights for designing user-friendly and secure biometric authentication systems.

Title: Can anxiety influences security advices
Number of students: 1 Master level
Description: Nowadays ChatGPT is used for a multitude of reasons. One is to ask advice on security topics. However, previous research showed that oftentimes ChatGPT creates answers based on previous interactions with it. Therefore, is it possible that also security advice change according to the previous interaction? And if this is the case, can more anxious props lead to completely different results? The student will have to read the previous literature on ChatGPT, find expert advice on security topics and create an experiment to determine if anxiety influenced the advice given by ChatGPT.

Title: Investigating ChatGPT privacy tradeoffs and users perception of them (English only)
Number of students: 1 Master level
Description: As ChatGPT grows in popularity, it becomes increasingly vital to examine the privacy trade-offs associated with its usage. The user's willingness to accept these trade-offs is instrumental in understanding the wider implications of employing AI language models. This topic involves a two-part exploration into the privacy trade-offs of using ChatGPT. Initially, the student will analyse ChatGPT's Terms and Conditions and conduct a short literature review to identify potential privacy trade-offs. The found trade-offs need to be categorised into a set of trade-offs that will be investigated. Subsequently, the student will design an online user study, incorporating various question types and a deception study, to gauge the willingness of ChatGPT users to accept these trade-offs. Finally, the student will test the designed online user study in the course of small pre-test.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyse the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Phishing through homographic attacks in messengers and social networks
Number of students: 1-2 Bachelor or Master level
Description: The task will be to test three types of attacks in messengers and social networks that work in some email clients. First is the link mismatch attack, where the link text differs from the actual link target. Second is an attack in which the actual link target is disguised by URL encoding [https://en.wikipedia.org/wiki/URL_encoding], and finally homographic attacks which uses Internationalized Domain Names [https://en.wikipedia.org/wiki/IDN_homograph_attack], in which Latin characters are replaced by characters of a different alphabet in the domain name. The attacks are predefined, so no knowledge of phishing techniques is required.

Title: Usability Study of Mobile Authentication for Elderly Users with Rheumatoid Arthritis (English only)
Number of students: 1 Bachelor or Master level
Description: Authentication is an ever important topic, especially in the mobile context. However, it becomes even more relevant when considering accessibility to it. Nowadays, a common authentication method is using a PIN. Yet, given the low hand mobility of users affected by rheumatoid arthritis, sometimes using PINs can be difficult. In this topic, the student will conduct several sessions of an already designed lab study with various participants using arthritis simulation gloves to evaluate three PIN-pad interfaces aimed at making authentication more accessible. The study will also investigate the preferences of users regarding PIN-pad interfaces through drawings and proposals of changes. The student will then analyse the results through inferential statistics. Depending on the quality of the outcome, the results will then be published in a paper and the student will be added to the authors list.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website (https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

V **Practical lab Security, Usability and Society (Bachelor)** **Practical course (P)**
2512554, SS 2024, 3 SWS, Language: German/English, Open in study portal **Online**

Content
The Praktikum Security, Usability and Society will cover topics both of usable security and privacy programming, and how to conduct user studies. To reserve a place, please, register on the WiWi portal and send an email with your chosen topic, plus a back-up one, to mattia.mossano@kit.edu . Topics are assigned first-come-first-served until all of them are filled. Topics in italics have already been assigned.

Application deadline 12.04.2024
Assignment 15.04.2024
Confirmation deadline 19.04.2024

Important dates:

Kick-off: 17.04.2024, 09:00 AM CET in Big Blue Button - Link

Report & code feedback deadline: 26.07.2024, 23:59 CET
Feedback on Report & code: 16.08.2024, 23:59 CET
Final report + code deadline: 01.09.2024, 23:59 CET

Presentation draft deadline: 06.09.2024, 23:59 CET
Feedback on presentation draft: 13.09.2024, 23:59 CET
Final presentation deadline: 17.09.2024, 23:59 CET

Presentation day: 18.09.2024, 09:00 CET

Topics:

Privacy Friendly Apps

In this area, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php . Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: NoPhish App
Number of students: 2 Ba/Ma
Description: The NoPhish app was one of the first measures from the NoPhish concept. The app has been around for a long time and has not been updated since then. Accordingly, the task of the project is to make the app functional for the current Android version. The app is also to be optimised so that updates, e.g. new chapters, can be added easily.

Programming Usable Security Intervention

In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, e.g. as an extension like TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Title: Hacking TORPEDO
Number of students: 1-2 Ba/Ma
Description: TORPEDO has existed for many years both as a Thunderbird add-on and as a web extension. TORPEDO is intended to help address various forms of phishing attacks and thereby protect the user, e.g. against various manipulations of the domain or additional tooltips. However, no targeted attacks on TORPEDO have yet been found. The aim of the work is to subject TORPEDO to a stress test and also to develop attacks that specifically target the implementation of TORPEDO.

Run Usable Security Studies and Results Analysis

These topics are related to run and analyse the results of user-studies. Online studies, interviews and lab studies are all possible, depending on the topic. At the end of the semester, the students present a report / paper with the analyses conducted and a talk in which they present the results.

Title: Visualization of Eye Gaze Patterns during Authetication Tasks
Number of students: 1 Ba/Ma
Description: In this project, students will analyze and visualize eye gaze data collected during two specific authentication tasks: the Dot Task and the Slider Task. The primary objective is to represent subjects' eye movements visually, enhancing the understanding of gaze patterns during the authentication process. *Dot Task Visualization:* For the Dot Task, participants were instructed to focus on a sequence of dots displayed on a screen. The dataset includes the positions of these dots and the corresponding gaze locations of the subjects. The student's task is to create a dynamic visualization that not only represents these positions accurately but also illustrates the sequence in which the dots were focused on by the subjects. *Slider Task Visualization:* The Slider Task involved presenting participants with a series of images, for which both the images' locations on the screen and the subjects' gaze locations are recorded. The challenge is to develop a heatmap visualization based on this data, effectively demonstrating the concentration and dispersion of gaze points across different images.

Title: Compare BSI Phishing Game with the NoPhish Game
Number of students: 1 Ba
Description: The NoPhish app, one of the first implementations of the NoPhish concept, is a form of serious game. The BSI has also developed a game in the field of phishing. Both "games" use different approaches to impart knowledge from the same context. The aim is to evaluate the two games in terms of similarities and differences.

Title: Phishing Advice from Organizations (English Only)
Number of students: 1 Ba
Description: Many companies distribute information on how to recognise phishing via various channels such as e-mails, e.g. Amazon or Telekom. The question arises as to how helpful these tips are in reality. Are they too specific to the context of the company or so abstractly formulated that they are of no real help to users? The aim of the work is to collect various hints and then compare them with the hints of the NoPhish concept in order to find differences and similarities between the hints and the concept.

Title: Chatbots for Literature Reviews
Number of students: 1 Ba
Description: Chatbots are becoming increasingly popular and are already being used in various areas. But in what form can these bots be used for science? The variety of chatbots also raises the question of whether there are chatbots that are better suited to a scientific context. The aim is to identify a selection of chatbots and evaluate them in terms of their effectiveness for future literature research. To this end, the results of the chatbots will be compared with the ACM database in order to check their effectiveness for finding literature for a specific period of time.

Title: Phishing through homographic attacks in messengers and social networks
Number of students: 1-2 Ba/Ma
Description: The task will be to test three types of attacks in messengers and social networks that work in some email clients. First is the link mismatch attack, where the link text differs from the actual link target. Second is an attack in which the actual link target is disguised by URL encoding [https://en.wikipedia.org/wiki/URL_encoding], and finally homographic attacks which uses Internationalized Domain Names [https://en.wikipedia.org/wiki/IDN_homograph_attack], in which Latin characters are replaced by characters of a different alphabet in the domain name. The attacks are predefined, so no knowledge of phishing techniques is required.

Title: Usability Study of Mobile Authentication for Elderly Users with Rheumatoid Arthritis (English only)
Number of students: 1 Ba/Ma
Description: Authentication is an ever important topic, especially in the mobile context. However, it becomes even more relevant when considering accessibility to it. Nowadays, a common authentication method is using a PIN. Yet, given the low hand mobility of users affected by rheumatoid arthritis, sometimes using PINs can be difficult. In this topic, the student will conduct several sessions of an already designed lab study with various participants using arthritis simulation gloves to evaluate three PIN-pad interfaces aimed at making authentication more accessible. The study will also investigate the preferences of users regarding PIN-pad interfaces through drawings and proposals of changes. The student will then analyse the results through inferential statistics. Depending on the quality of the outcome, the results will then be published in a paper and the student will be added to the authors list.

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website (https://secuso.aifb.kit.edu/Studium_und_Lehre.php) .

T 7.11 Course: Advanced Lab Sociotechnical Information Systems Development (Master) [T-WIWI-111125]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
WT 23/24	2512401	Practical Course Sociotechnical Information Systems Development (Master)	3 SWS	Practical course /	Sunyaev, Goram, Leiser
Exams					
WT 23/24	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev
ST 2024	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

T 7.12 Course: Advanced Machine Learning [T-WIWI-109921]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr. Abdolreza Nazemi

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2540535	Advanced Machine Learning	2 SWS	Lecture	Nazemi
ST 2024	2540536	Exercise Advanced Machine Learning	1 SWS	Practice	Nazemi
Exams					
WT 23/24	7900253	Advanced Machine Learning (Nachklausur SoSe 2023)			Geyer-Schulz
ST 2024	7900227	Advanced Machine Learning			Geyer-Schulz

Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Advanced Machine Learning

2540535, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
In recent years, the volume, variety, velocity, veracity, and variability of available data have increased due to improvements in computational and storage power. The rise of the Internet has made available large sets of data that allow us to use and merge them for different purposes. Data science helps us to extract knowledge from the continually-increasing large datasets. This course will introduce students to a wide range of machine learning and statistical techniques such as deep learning, LASSO, and support vector machine. You will get familiar with text mining, and the tools you need to analyze the various facets of data sets in practice. Students will learn theory and concepts with real data sets from different disciplines such as marketing, finance, and business.

Tentative Course Outline:

- Introduction
- Statistical Inference
- Shrinkage Methods
- Model Assessment and Selection
- Tree-based Machine Learning Algorithms
- Dimensionality Reduction
- Neural Networks and Deep Learning
- Natural Language Processing with Deep Learning
- Support Vector Machine

Time of attendance

- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m

The student will learn

- A wide range of machine learning algorithms and their weaknesses.
- The fundamental issues and challenges: data, high-dimension, train, model selection, etc.
- How to imply machine learning algorithms for real-world applications.
- The fundamentals of deep learning, main research activities, and on-going research in this field.

Literature

- Alpaydin, E. (2014). Introduction to Machine Learning. Third Edition, MIT Press.
- De Prado, M. L. (2018). Advances in Financial Machine Learning. John Wiley & Sons.
- Goodfellow, I., Bengio, Y., and A. Courville (2017). Deep Learning. MIT Press. (online available)
- Hastie, T., Tibshirani, R., and J. Friedman (2009). Elements of Statistical Learning. Second Edition. Springer. (online available)
- Leskovec, J., Rajaraman, A., Ullman, J. D., (2014). Mining of Massive Datasets. Cambridge University Press. (online available)
- Witten, I. H., Eibe, F., Hall, M. A., Pal, C. J. (2016). Data Mining: Practical Machine Learning Tools and Techniques. Morgan Kaufmann.

T 7.13 Course: Advanced Machine Learning and Data Science [T-WIWI-111305]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105659 - Advanced Machine Learning and Data Science

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each term	2

Events					
ST 2024	2500016	Advanced Machine Learning and Data Science	4 SWS	Project (P / ⛐	Ulrich

Legend: 🖥 Online, ⛐ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Due to the professor's research sabbatical, the BSc module "Financial Data Science" and MSc module "Foundations for Advanced Financial -Quant and -Machine Learning Research" and the MSc module "Advanced Machine Learning and Data Science" along with the respective examinations will not be offered in SS2023. Bachelor and Master thesis projects are not affected and will be supervised.

The assessment is carried out in form of a written thesis based on the course "Advanced Machine Learning and Data Science".

Annotation
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning. Please apply via the link: https://portal.wiwi.kit.edu/forms/form/fbv-ulrich-msc-project.

An online meetup will be offered at 14:00 on Tuesday of the first week of summer semester 2022 (i.e., 19.04.2022).

Below you will find excerpts from events related to this course:

V Advanced Machine Learning and Data Science

2500016, SS 2024, 4 SWS, Language: English, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
The course is targeted to students with a major in Data Science and/or Machine Learning. It offers students the opportunity to develop hands-on knowledge on new developments in data science and machine learning.

Organizational issues
Während des Kick-off Meetings in der ersten Wochen werden Themen vorgestellt.

Wir bereiten Themen für Studenten der Informatik, W-Ing und Wi-Ma vor.

Themen und studentische Bearbeiter werden nach dem Kick-off gematched.

Literature
Literatur und Computerprogramme wird in der ersten Vorlesung bekannt gegeben.

T 7.14 Course: Advanced Management Accounting [T-WIWI-102885]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2579907	Advanced Management Accounting	4 SWS	Lecture / 🗣	Wouters, Dickemann, Letmathe
Exams					
WT 23/24	79-2579907-M	Advanced Management Accounting			Wouters

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (30 min) (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendation
The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Annotation
This course is held in English. Lectures and tutorials are integrated.

The course is compulsory and must be examined.

Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters∂kit.edu).

Below you will find excerpts from events related to this course:

V Advanced Management Accounting

2579907, WS 23/24, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This course is held in English. Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

Inhalt:

- The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

Learning objectives:

- Students will be able to consider advanced management accounting methods in an interdisciplinary way and to apply these to managerial decision-making problems in operations and innovation.
- They will also be able to identify relevant research results on such methods.

Examination:

- The assessment consists of an oral exam (30 min) taking place in the recess period (according to § 4 (2) No. 2 of the examination regulation).
- The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Required prior Courses:

- The course is compulsory and must be examined.

Recommendations:

- The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Workload:

- The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature is mostly made available via ILIAS.

T 7.15 Course: Advanced Statistics [T-WIWI-103123]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101637 - Analytics and Statistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2550553	Übung zu Statistik für Fortgeschrittene	2 SWS	Practice /	Grothe
Exams					
WT 23/24	7900289	Advanced Statistics			Grothe

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

T 7.16 Course: Advanced Stochastic Optimization [T-WIWI-106548]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Irregular	2

Exams			
ST 2024	7900034	Advanced Stochastic Optimization	Rebennack

Competence Certificate
The assessment consists of an oral exam (20 minutes). The exam is offered every semester.

Prerequisites
None.

Annotation
Lectures and tutorials are offered irregularly.

T 7.17 Course: Advanced Topics in Digital Management [T-WIWI-111912]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2024	2573016	Advanced Topics in Digital Management	2 SWS	Colloquium (K / 🗣)	Nieken, Mitarbeiter

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment. The following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendation
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas digital HRM, personnel economics, and leadership and those who are interest in an academic career path.

Below you will find excerpts from events related to this course:

V **Advanced Topics in Digital Management** — **Colloquium (KOL) On-Site**
2573016, SS 2024, 2 SWS, Language: English, Open in study portal

Content
The students will discuss and analyze selected research papers in the areas digital HRM, personnel economics, and leadership with a focus on digital management. The students will present research papers and discuss research methods and designs as well as content. They will develop an own research design on a predefined topic.

Aim

The student

- Looks into current research topics in the areas HRM, personnel economics, and leadership with a focus on digital management and AI.
- Analyzes research papers in detail and evaluates the research outcomes.
- Trains their presentation skills and discussion skills.
- Practices scientific debating.
- Learns to critically evaluate research methods and trains the scientific discussion culture.
- Gains deeper knowledge in the area of digital HRM and management.
- Learns to evaluate research designs and takes into account the ethical dimension of research.
- Learns how to develop an own research design and idea.

Notes

Due to the interactive nature of the course, the number of participants is limited. If you are interested, please contact Prof. Nieken by email.

Workload

The total workload for this course is approximately 90 hours.

Lecture: 30 hours

Preparation: 45 hours

Exam preparation: 15 hours

Literature

Selected research papers

Organizational issues
Geb. 05.20, Raum 2A-25, Termine werden bekannt gegeben

T 7.18 Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101497 - Agglomeration and Innovation
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2024	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture / 🗣	Mitusch, Brumm
ST 2024	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice / 🗣	Pegorari, Corbo

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

Prerequisites
None

Recommendation
This course is designed for advanced Master students with a strong interest in economic theory and mathematical models. Bachelor students who would like to participate are free to do so, but should be aware that the level is much more advanced than in other courses of their curriculum.

Below you will find excerpts from events related to this course:

V Advanced Topics in Economic Theory

2520527, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Die Veranstaltung wird in englischer Sprache angeboten:

The course is based on the excellent textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

T 7.19 Course: Advanced Topics in Human Resource Management [T-WIWI-111913]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Competence Certificate
Alternative exam assessment.The following aspects are included:

- Regular and active participation in the course dates
- Presentation of a given research topic.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Recommendation
We recommend visiting the course Incentives in Organization before taking this course.
The course is strongly recommended for students interested in empirical research in the areas HRM, personnel economics, and leadership and those who are interest in an academic career path.

T 7.20 Course: Airport Logistics [T-MACH-105175]

Responsible: Dr.-Ing. André Richter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	2

Events					
WT 23/24	2117056	Airport logistics	2 SWS	Lecture / 🗣	Richter
Exams					
WT 23/24	76-T-MACH-105175	Airport Logistics			Richter, Furmans

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Airport logistics

2117056, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Media
Presentations

Learning content

- Introduction
- Airport installations
- Luggage transport
- Passenger transport
- Security on the airport
- Legal bases of the air traffic
- Freight on the airport

Learning goals
The students are able to:

- Describe material handling and informations technology activities on airports,
- Evaluate processes and systems on airports as the law stands, and
- Choose appropriate processes and material handling systems for airports.

Recommendations
None

Workload
Regular attendance: 21 hours
Self-study: 99 hours

Note
Limited number of participants: allocation of places in sequence of registration (first come first served). Registration via "ILIAS" mandatory.
Personal presence during lectures mandatory.

Organizational issues
Termine: siehe ILIAS.

Literature
„Gepäcklogistik auf Flughäfen“ à http://www.springer.com/de/book/9783642328527

T 7.21 Course: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

Responsible: Dr.-Ing. Marcus Gohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2134150	Gas, lubricating oil and operating media analysis in drive train development	2 SWS	Lecture / 🗣	Gohl

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Letter of attendance or oral exam (25 minutes, no auxillary means)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Gas, lubricating oil and operating media analysis in drive train development

2134150, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.

T 7.22 Course: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

Responsible: Jürgen Pfeil
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2134134	Analysis tools for combustion diagnostics	2 SWS	Lecture / 🗣	Pfeil
Exams					
WT 23/24	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics			Koch

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Analysis tools for combustion diagnostics

2134134, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Skript, erhältlich in der Vorlesung

T 7.23 Course: Application of Social Science Methods (WiWi) [T-GEISTSOZ-109052]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101169 - Sociology

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each term	2

Events					
ST 2024	5011002	Computational Social Science: Topics and positions in the German Parliament (Part 1)	2 SWS	Seminar /	Banisch
ST 2024	5011006	Gender Pay Gap	2 SWS	Seminar /	Nollmann
ST 2024	5011008	Decomposition and Regression Analysis	2 SWS	Seminar /	Nollmann
Exams					
WT 23/24	7400048	Application of Social Science Methods (WiWi)			Nollmann
ST 2024	7400368	Application of Social Science Methods			Nollmann, Staudt
ST 2024	7400453	Application of Social Science Methods (WiWi)			Nollmann

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 7.24 Course: Applied Econometrics [T-WIWI-111388]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2520020	Applied Econometrics	2 SWS	Lecture / 🗣	Krüger, Eberl
WT 23/24	2520021	Tutorial in Applied Econometrics	2 SWS	Practice / 🗣	Eberl, Koster
Exams					
WT 23/24	7900251	Applied Econometrics			Krüger
ST 2024	7900007	Applied Econometrics			Krüger

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation. A bonus can be acquired by successful completion of an assignment (written report + short in-class presentation) during the semester. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Applied Econometrics

2520020, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Content:

The course covers two econometric topics: (1) Conditional expectation and regression, and (2) Causal inference. Part (1) reviews foundations like the best linear predictor, least squares estimation, and robust covariance estimation. Part (2) introduces the potential outcomes framework for studying causal, what-if type questions such as `How does an internship affect a person's future wage?'. It then presents research strategies like randomized trials, instrumental variables, and regression discontinuity.

For each part, we discuss econometric methods and theory, empirical examples (including recent research papers), and R implementation.

Learning goal:

Students are able to assess the properties of various econometric estimators and research designs, and to implement econometric estimators using R software.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Independent Study: 105 hours

Literature

Angrist, J.D., and J.-S. Pischke (2009): Mostly Harmless Econometrics. Princeton University Press.

Cattaneo, M.D., N. Idrobo and R. Titiunik (2020): A Practical Introduction to Regression Discontinuity Designs: Foundations. Cambridge University Press.

Hansen, B. (2022): Econometrics. Princeton University Press.

DiTraglia, F.J. (2021): Lecture Notes on Treatment Effects. Course notes, available at https://www.treatment-effects.com/.

T 7.25 Course: Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-110339]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2511032	Applied Informatics - Internet Computing	2 SWS	Lecture / 🗣	Sunyaev
ST 2024	2511033	Übungen zu Angewandte Informatik - Internet Computing	1 SWS	Practice / 🧩	Sunyaev, Rank, Guse
Exams					
WT 23/24	79AIFB_AI-IC_B4	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services			Sunyaev
ST 2024	79AIFB_AI2_A2	Applied Informatics - Internet Computing (Registration until 15 July 2024)			Sunyaev

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

Successful participation in the exercise by submitting correct solutions to 50% of the exercises can earn a grade bonus. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Annotation
Replaces from winter semester 2019/2020 T-WIWI-109445 "Applied Informatics - Internet Computing".

Below you will find excerpts from events related to this course:

V Applied Informatics - Internet Computing

2511032, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture Applied Computer Science - Internet Computing provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

Learning objectives:

The student learns about basic concepts and emerging technologies of distributed systems and internet computing. Practical topics will be deepened in lab classes.

Recommendations:

Knowledge of content of the module [WI1INFO].

Workload:

The total workload for this course is approximately 135-150 hours.

Literature
Wird in der Vorlesung bekannt gegeben

T 7.26 Course: Applied material flow simulation [T-MACH-112213]

Responsible: Dr.-Ing. Marion Baumann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2117054	Applied material flow simulation	3 SWS	Lecture / Practice (/	Baumann
Exams					
WT 23/24	76-T-MACH-112213	Applied material flow simulation			Baumann, Furmans

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
None

Recommendation

- Basic statistical knowledge and understanding
- Knowledge of a common programming language (Java, Python, ...)
- Recommended course: T-WIWI-102718 - Discrete Event Simulation in Production and Logistics

Below you will find excerpts from events related to this course:

V **Applied material flow simulation** — **Lecture / Practice (VÜ) On-Site**
2117054, WS 23/24, 3 SWS, Language: German, Open in study portal

Content
Learning Content:

- Methods of modeling a simulation such as:
  - Discrete-event simulation
  - Agent based simulation
- Design of a simulation model of a material flow system
- Data exchange in simulation models
- Verification and validation of simulation models
- Execution of simulation studies
- Statistical evaluation and parameter study

This is an application-oriented course in which the course contents are applied and deepened using the Anylogic software.

Learning Goals:
Students are able to:

- select the appropriate simulation modeling method depending on a modeling objective and build a suitable simulation model for material flow systems,
- extend a simulation model in a meaningful way with data import and export,
- verify and validate a simulation model,
- conduct a simulation study efficiently and with meaningful results, and
- design and conduct a parameter study and statistically analyze and evaluate the results.

Recommendations:

- Basic statistical skills
- Prior knowledge of a common programming language (Java, Python, ...).
- Recommended course: T-WIWI-102718 - Discrete Event Simulation in Production and Logistics

Workload for 4,5 ECTS (135 h):

- regular attendance: 21 hours
  self-study: 114 hours

Organizational issues

- **Im Wintersemester 2023/2024 ist die Veranstaltung auf maximal 30 Teilnehmer beschränkt.**
- **Die Anmeldung ist durch Beitritt zum ILIAS-Kurs und Ausfüllen des Anmeldungsformulars (erforderliche Felder beim Beitritt zum ILIAS-Kurs) möglich.**
- **Die Anmeldung ist vom 01.09.2023 bis zum 30.09.2023 möglich.**

Literature
Borshev, A. (2022): The Big Book of Simulation Modeling - Multimethod Modeling with AnyLogic 8, https://www.anylogic.de/resources/books/big-book-of-simulation-modeling/.

Grigoryev, I. (2021): AnyLogic8 in Three Days, 5. Aufl., https://www.anylogic.de/resources/books/free-simulation-book-and-modeling-tutorials/.

Gutenschwager, K. et. al. (2017): Simulation in Produktion und Logistik, Springer Vieweg, Berlin.

VDI (2014): Simulation von Logistik-, Materialfluss- und Produktionssystemen - Grundlagen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

VDI (2016): Simulation von Logistik-, Materialfluss- und Produktionssystemen - Simulation und Optimierung. VDI Richtlinie 3633, Blatt 12, VDI-Verlag, Düsseldorf

T 7.27 Course: Artificial Intelligence in Production [T-MACH-112115]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105968 - Artificial Intelligence in Production
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 23/24	2149921	Artificial Intelligence in Production	2 SWS	Lecture /	Fleischer
Exams					
WT 23/24	76-T-MACH-112115	Artificial Intelligence in Production			Fleischer
ST 2024	76-T-MACH-112115	Artificial Intelligence in Production			Fleischer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written Exam (90 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Production

2149921, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The module AI in Production is designed to teach students the practical, holistic integration of machine learning and artificial intelligence methods in production. The course is oriented towards the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content-related aspects (methods) within the individual phases. In addition to teaching the practical aspects of integrating the most important machine learning methods, the focus is primarily on the necessary steps for data generation and data preparation as well as the implementation and validation of the methods in an industrial environment.

The lecture"Artificial Intelligence in Production" deals with the theoretical basics in a practical context. Here, the six phases of the CRISP-DM process are run through sequentially and the necessary basics for the implementation of the respective phases are taught. The course first deals with the data sources that are prevalent in the production environment. Subsequently, possibilities for target-oriented data acquisition as well as data transfer and data storage are introduced. Possibilities for data filtering and data preprocessing are discussed and production-relevant aspects are pointed out. The course then covers in detail the necessary algorithms and procedures for implementing AI in production, before techniques and fundamentals for making the models permanent in production (deployment) are discussed.

Learning Outcomes:

The students

- understand the relevance for the application of AI in production and know the main drivers and challenges.
- will understand the CRISP-DM process for implementing AI projects in manufacturing. Students will be able to name the main data sources, data ingestion methods, communication architectures, models and methods for data processing.
- will understand the main machine learning techniques and be able to contrast and select them in the context of industrial issues.
- are able to assess whether a specific problem in the context of production can be solved in a target-oriented manner using machine learning methods, as well as what the necessary steps are for implementation.
- are able to assess the most important challenges and name possible approaches to solve them.
- are able to apply the phases of the CRISP-DM to a problem in production. Students will know the steps necessary to build a data pipeline and will be able to do so theoretically in the context of a real-world use case.
- are able to evaluate the results of common deep learning methods and, based on this, to theoretically elaborate and theoretically apply proposed solutions (from the field of machine learning).

Workload:

MACH:
regular attendance: 31,5 hours
self-study: 88,5 hours
WING:
regular attendance: 31,5 hours
self-study: 118,5 hours

Organizational issues
Vorlesungstermine freitags 14:00 Uhr, Übungstermine freitags 15:45 Uhr.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.28 Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2595650	Artificial Intelligence in Service Systems	1,5 SWS	Lecture /	Kühl, Spitzer, Vössing
WT 23/24	2595651	Übung zu Artificial Intelligence in Service Systems	1,5 SWS	Practice /	Kühl, Spitzer, Schemmer
Exams					
WT 23/24	7900118	Artificial Intelligence in Service Systems			Satzger
ST 2024	7900226	Artificial Intelligence in Service Systems			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 min). Successful completion of the exercises is a prerequisite for admission to the written exam.

Prerequisites
None

Annotation
The course will be offered in the form of a flipped classroom concept starting in winter semester 2022/2023. The lecture will be recorded in advance and made available online. During the exercise classes, the contents of the lecture will be discussed and applied as part of programming exercises.

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Service Systems

2595650, WS 23/24, 1,5 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Artificial Intelligence (AI) and the application of machine learning is becoming more and more popular to solve relevant business challenges — both within isolated entities but also within co-creating systems (like value chains). However, it is not only essential to be familiar with precise algorithms but rather a general understanding of the necessary steps with a holistic view—from real-world challenges to the successful deployment of an AI-based solution. As part of this course, we teach the complete lifecycle of an AI project focusing on supervised machine learning challenges. We do so by also introducing the use of Python and the required packages like scikit-learn with exemplary data and use cases. We then take this knowledge to the more complex case of service systems with different entities (e.g., companies) who interact with each other and show possibilities on how to derive holistic insights. Apart from the technical aspects necessary when developing AI within service systems, we also shed light on the collaboration of humans and AI in such systems (e.g., with the support of XAI), topics of ethics and bias in AI, as well as AI's capabilities on being creative.

Students of this course will be able to understand and implement the complete lifecycle of a typical Artificial Intelligence use case with supervised machine learning. Furthermore, they understand the importance and the means of applying AI and Machine Learning within service systems, which allows multiple, independent entities to collaborate and derive insights. Besides technical aspects, they will gain an understanding of the broader challenges and aspects when dealing with AI. Students will be proficient with typical Python code for AI challenges.

Organizational issues
The course will be offered in the form of a flipped classroom concept starting in winter semester 2022/2023. The lecture will be recorded in advance and made available online. During the exercise classes, the contents of the lecture will be discussed and applied as part of programming exercises.

Literature

- Baier, L., Kühl, N., & Satzger, G. (2019). How to cope with change?-preserving validity of predictive services over time. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Cawley, G. C., & Talbot, N. L. (2010). On over-fitting in model selection and subsequent selection bias in performance evaluation. The Journal of Machine Learning Research, 11, 2079-2107.
- Fink, O., Netland, T., & Feuerriegel, S. (2021). Artificial intelligence across company borders. arXiv preprint arXiv:2107.03912.
- Gama, J., Žliobaitė, I., Bifet, A., Pechenizkiy, M., & Bouchachia, A. (2014). A survey on concept drift adaptation. ACM computing surveys (CSUR), 46(4), 1-37.
- Hemmer, P., Schemmer, M., Vössing, M., & Kühl, N. (2021). Human-AI Complementarity in Hybrid Intelligence Systems: A Structured Literature Review. PACIS 2021 Proceedings.
- Hirt, R., & Kühl, N. (2018). Cognition in the Era of Smart Service Systems: Inter-organizational Analytics through Meta and Transfer Learning. In 39th International Conference on Information Systems, ICIS 2018; San Francisco Marriott MarquisSan Francisco; United States; 13 December 2018 through 16 December 2018.
- Kühl, N., Goutier, M., Hirt, R., & Satzger, G. (2019, January). Machine Learning in Artificial Intelligence: Towards a Common Understanding. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Kühl, N., Hirt, R., Baier, L., Schmitz, B., & Satzger, G. (2021). How to Conduct Rigorous Supervised Machine Learning in Information Systems Research: The Supervised Machine Learning Report Card. Communications of the Association for Information Systems, 48(1), 46.
- Maleshkova, M., Kühl, N., & Jussen, P. (Eds.). (2020). Smart Service Management: Design Guidelines and Best Practices. Springer Nature.
- Martin, D., Hirt, R., & Kühl, N. (2019). Service Systems, Smart Service Systems and Cyber-Physical Systems—What's the difference? Towards a Unified Terminology. 14. Internationale Tagung Wirtschaftsinformatik 2019 (WI 2019), Siegen, Germany, February 24-27.
- Mehrabi, N., Morstatter, F., Saxena, N., Lerman, K., & Galstyan, A. (2019). A survey on bias and fairness in machine learning. arXiv preprint arXiv:1908.09635.
- Müller, V. C., & Bostrom, N. (2016). Future progress in artificial intelligence: A survey of expert opinion. In Fundamental issues of artificial intelligence (pp. 555-572). Springer, Cham.
- Pan, S. J., & Yang, Q. (2009). A survey on transfer learning. IEEE Transactions on knowledge and data engineering, 22(10), 1345-1359.
- Schöffer, J., Machowski, Y., & Kühl, N. (2021). A Study on Fairness and Trust Perceptions in Automated Decision Making. In Joint Proceedings of the ACM IUI 2021 Workshops, April 13–17, 2021, College Station, USA.
- Shmueli, G., & Koppius, O. R. (2011). Predictive analytics in information systems research. MIS quarterly, 553-572.
- Zahn, M. V., Feuerriegel, S., & Kühl, N. (2021). The cost of fairness in AI: Evidence from e-commerce. Business & information systems engineering.

T 7.29 Course: Artificial Intelligence in Service Systems - Applications in Computer Vision [T-WIWI-111219]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2595501	Artificial Intelligence in Service Systems - Applications in Computer Vision	3 SWS	Lecture / 🗣	Satzger, Schmitz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-105778 - Service Analytics A must not have been started.

Annotation
This course is admission restricted (see http://dsi.iism.kit.edu).

The course replaces "Service Analytics A" as of summer semester 2021.

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Service Systems - Applications in Computer Vision

2595501, SS 2024, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
---We renamed this course from "Service Analytics A" to "Artificial Intelligence in Service Systems - Applications in Computer Vision ---

Learning objectives

This course teaches students how to apply machine learning concepts to develop predictive models that form the basis of many innovative service offerings and business models today. Using a selected use case each term, students learn the foundations of selected algorithms and development frameworks and apply them to build a functioning prototype of an analytics-based service. Students will become proficient in writing code in Python to implement a data science use case over the course period.

Description

Data-driven services have become a key differentiator for many companies. Their development is based on the increasing availability of structured and unstructured data and their analysis through methods from data science and machine learning. Examples comprise highly innovative service offerings based on technologies such as natural language processing, computer vision or reinforcement learning.

Using a selected use case, this lecture will teach students how to develop analytics-based services in an applied setting. We teach the theoretical foundations of selected machine learning algorithms (e.g., convolutional neural networks) and development concepts (e.g., developing modeling, training, inference pipelines) and teach how to apply these concepts to build a functioning prototype of an analytics-based service (e.g., inference running on a device). During the course, students will work in small groups to apply the learned concepts in the programming language Python using packages such as Keras, Tensorflow or Scikit-Learn. For more information on recent projects as part of the course, please visit the website of our lecture: https://www.aiss-cv.com.

Recommendations

The course is aimed at students in the Master's program with basic knowledge in statistics and applied programming in Python. Knowledge from the lecture Artificial Intelligence in Service Systems may be beneficial.

Additional information

The lecture will be held as part of 7 blocks within the summer semester. Due to the practical group sessions in the course, the number of participants is limited. The official application period in the WiWi portal will open mid of February. Please apply here: https://go.wiwi.kit.edu/aiss-cv. The course will be held mainly online via Zoom. For interim and final presentation, we will meet in person. Further information on the dates and rooms of interim and final presentation will be announced via Ilias and mail.

Literature

- Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. *The elements of statistical learning*. Vol. 1. No. 10. New York: Springer series in statistics, 2001.
- Russell, S., & Norvig, P. (2002). Artificial intelligence: a modern approach.
- Goldstein, E. B. (2009). Sensation and perception. 8th. *Belmont: Wadsworth*, *Cengage Learning*, *496*(3).
- Gonzalez, Rafael C., Woods, Richard E. (2018). *Digital Image Processing*. 4th Pearson India
- Szeliski, R. (2010). *Computer vision: algorithms and applications*. Springer Science & Business Media.
- Redmon, J., Divvala, S., Girshick, R., & Farhadi, A. (2016). You only look once: Unified, real-time object detection. In *Proceedings of the IEEE conference on computer vision and pattern recognition*(pp. 779-788).
- Sermanet, P., Chintala, S., & LeCun, Y. (2012, November). Convolutional neural networks applied to house numbers digit classification. In *Proceedings of the 21st International Conference on Pattern Recognition (ICPR2012)*(pp. 3288-3291). IEEE.
- Ren, S., He, K., Girshick, R., & Sun, J. (2015). Faster r-cnn: Towards real-time object detection with region proposal networks. In *Advances in neural information processing systems*(pp. 91-99).
- Girshick, R., Donahue, J., Darrell, T., & Malik, J. (2014). Rich feature hierarchies for accurate object detection and semantic segmentation. In *Proceedings of the IEEE conference on computer vision and pattern recognition*(pp. 580-587).
- Krizhevsky, A., Sutskever, I., & Hinton, G. E. (2012). Imagenet classification with deep convolutional neural networks. In *Advances in neural information processing systems*(pp. 1097-1105).

T 7.30 Course: Asset Pricing [T-WIWI-102647]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2530555	Asset Pricing	2 SWS	Lecture / 🗣	Uhrig-Homburg, Müller
ST 2024	2530556	Asset Pricing	1 SWS	Practice / 🗣	Böll, Uhrig-Homburg, Müller
Exams					
WT 23/24	7900056	Asset Pricing			Uhrig-Homburg

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

Below you will find excerpts from events related to this course:

V **Asset Pricing** — **Practice (Ü) On-Site**
2530556, SS 2024, 1 SWS, Language: German, Open in study portal

T 7.31 Course: Auction Theory [T-WIWI-102613]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2520408	Auktionstheorie	2 SWS	Lecture	Ehrhart
WT 23/24	2520409	Übungen zu Auktionstheorie	1 SWS	Practice	Ehrhart
Exams					
WT 23/24	7900039	Auction Theory			Ehrhart
ST 2024	7900255	Auction Theory			Ehrhart

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Auktionstheorie

2520408, WS 23/24, 2 SWS, Open in study portal **Lecture (V)**

Literature

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

T 7.32 Course: Automated Manufacturing Systems [T-MACH-102162]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101298 - Automated Manufacturing Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	2

Events					
ST 2024	2150904	Automated Manufacturing Systems	6 SWS	Lecture / Practice (/ 🗣	Fleischer
Exams					
WT 23/24	76-T-MACH-102162	Automated Manufacturing Systems			Fleischer
ST 2024	76-T-MACH-102162	Automated Manufacturing Systems			Fleischer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam (120 minutes)

Prerequisites
"T-MACH-108844 - Automatisierte Produktionsanlagen" must not be commenced.

Below you will find excerpts from events related to this course:

V Automated Manufacturing Systems

2150904, SS 2024, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture gives an overview of the structure and functioning of automated production plants. In a basic chapter, fundamental elements for the realisation of automated production systems are taught. These include:

- Drive and control technology
- Handling technology for handling workpieces and tools
- Industrial robot technology
- Quality assurance in automated production plants
- Automated machines, cells, centres and systems for production and assembly
- Structures of multi-machine systems
- Project planning of automated production plants

An interdisciplinary view of these sub-areas results in interfaces to Industry 4.0 approaches. The basic chapters are supplemented by practical application examples and live demonstrations in the Karlsruhe Forschungsfabrik.

In the second part of the lecture, the fundamentals taught will be clarified using practically executed production processes for manufacturing and disassembling components, and the automated production facilities for manufacturing these components will be analyzed. In the field of automotive powertrain technology, the automated production process for both the manufacture and disassembly of batteries is considered. In the powertrain area, automated production facilities for the disassembly of electric motors are considered. Furthermore, automated production systems for the field of additive manufacturing are considered.

Within tutorials, the contents from the lecture are deepened and applied to concrete problems and tasks.

Learning Outcomes:

The students …

- are able to analyze implemented automated manufacturing systems and describe their components.
- are capable to assess the implemented examples of implemented automated manufacturing systems and apply them to new problems.
- are able to name automation tasks in manufacturing plants and name the components which are necessary for the implementation of each automation task.
- are capable with respect to a given task to plan the configuration of an automated manufacturing system and to determine the necessary components to its realization.
- are able to design and select components for a given use case of the categories: "Handling Technology", "Industrial Robotics", "Sensory" and "Controls".
- are capable to compare different concepts for multi-machine systems and select a suitable concept for a given use case.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine dienstags 8:00 Uhr und donnerstags 8:00 Uhr, Übungstermine donnerstags 09:45 Uhr.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.33 Course: Automotive Engineering I [T-MACH-100092]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Language	Version
Written examination	6	Grade to a third	Each winter term	1 terms		3

Events					
WT 23/24	2113805	Automotive Engineering I	4 SWS	Lecture / 🗣	Gauterin, Gießler
WT 23/24	2113809	Automotive Engineering I	4 SWS	Lecture / 🗣	Gauterin, Gießler
Exams					
WT 23/24	76-T-MACH-100092	Automotive Engineering			Unrau, Gauterin
ST 2024	76-T-MACH-100092	Automotive Engineering			Gauterin, Gießler

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination

Duration: 120 minutes

Auxiliary means: none

Prerequisites
The brick "T-MACH-102203 - Automotive Engineering I" is not started or finished. The bricks "T-MACH-100092 - Grundlagen der Fahrzeugtechnik I" and "T-MACH-102203 - Automotive Engineering I" can not be combined.

Below you will find excerpts from events related to this course:

V Automotive Engineering I

2113805, WS 23/24, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performance, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5. Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/Passwoerterllias/

Kann nicht mit der Veranstaltung [2113809] kombiniert werden.

Can not be combined with lecture [2113809].

Literature
1. Mitschke, M. / Wallentowitz, H.: Dynamik der Kraftfahrzeuge, Springer Vieweg, Wiesbaden 2014

2. Pischinger, S. / Seiffert, U.: Handbuch Kraftfahrzeugtechnik, Springer Vieweg, Wiesbaden 2016

3. Gauterin, F. / Unrau, H.-J. / Gnadler, R.: Scriptum zur Vorlesung "Grundlagen der Fahrzeugtechnik I", KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

V

Automotive Engineering I

2113809, WS 23/24, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5.Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues
You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/, students from eucor universities send an e-mail to martina.kaiser@kit.edu

Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.

Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Literature
1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichister 2015

2. Onori, S. / Serrao, L: / Rizzoni, G.: Hybrid Electric Vehicles - Energy Management Strategies, Springer London, Heidelberg, New York, Dordrecht 2016

3. Reif, K.: Brakes, Brake Control and Driver Assistance Systems - Function, Regulation and Components, Springer Vieweg, Wiesbaden 2015

4. Gauterin, F. / Gießler, M. / Gnadler, R.: Scriptum zur Vorlesung 'Automotive Engineering I', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

T 7.34 Course: Automotive Engineering I [T-MACH-102203]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 23/24	2113809	Automotive Engineering I	4 SWS	Lecture / 🗣	Gauterin, Gießler
Exams					
WT 23/24	76-T-MACH-102203	Automotive Engineering I			Gauterin
ST 2024	76-T-MACH-102203	Automotive Engineering I			Gauterin

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination

Duration: 120 minutes

Auxiliary means: none

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100092 - Automotive Engineering I must not have been started.

Below you will find excerpts from events related to this course:

V Automotive Engineering I

2113809, WS 23/24, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5.Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues
You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/, students from eucor universities send an e-mail to martina.kaiser@kit.edu

Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.

Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Literature
1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichister 2015

2. Onori, S. / Serrao, L: / Rizzoni, G.: Hybrid Electric Vehicles - Energy Management Strategies, Springer London, Heidelberg, New York, Dordrecht 2016

3. Reif, K.: Brakes, Brake Control and Driver Assistance Systems - Function, Regulation and Components, Springer Vieweg, Wiesbaden 2015

4. Gauterin, F. / Gießler, M. / Gnadler, R.: Scriptum zur Vorlesung 'Automotive Engineering I', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährlich aktualisiert

T 7.35 Course: Automotive Engineering II [T-MACH-102117]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2114835	Automotive Engineering II	2 SWS	Lecture / 🗣	Gießler
ST 2024	2114855	Automotive Engineering II	2 SWS	Lecture / 🗣	Gießler
Exams					
WT 23/24	76-T-MACH-102117	Automotive Engineering II			Unrau, Gauterin
WT 23/24	76T-MACH-102117-2	Automotive Engineering II			Gauterin, Unrau
ST 2024	76-T-MACH-102117	Automotive Engineering II			Gauterin, Gießler

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Automotive Engineering II

2114835, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, comparison of designs

Learning Objectives:

The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle bodywork and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

Organizational issues
Kann nicht mit der Veranstaltung [2114855] kombiniert werden.

Can not be combined with lecture [2114855]

Literature

1. Heißing, B. / Ersoy, M.: Fahrwerkhandbuch: Grundlagen, Fahrdynamik, Komponenten, Systeme, Mechatronik, Perspektiven, Springer Vieweg, Wiesbaden, 2013

2. Breuer, B. / Bill, K.-H.: Bremsenhandbuch: Grundlagen - Komponenten - Systeme - Fahrdynamik, Springer Vieweg, Wiesbaden, 2017

3. Unrau, H.-J. / Gnadler, R.: Scriptum zur Vorlesung 'Grundlagen der Fahrzeugtechnik II', KIT, Institut für Fahrzeugsystemtechnik, Karlsruhe, jährliche Aktualisierung

V

Automotive Engineering II

2114855, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, comparison of the designs

Learning Objectives:

The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

Literature
Elective literature:

1. Robert Bosch GmbH: Automotive Handbook, 9th Edition, Wiley, Chichester 2015
2. Heißing, B. / Ersoy, M.: Chassis Handbook - fundamentals, driving dynamics, components, mechatronics, perspectives, Vieweg+Teubner, Wiesbaden 2011
3. Gießler, M. / Gnadler, R.: Script to the lecture "Automotive Engineering II", KIT, Institut of Vehicle System Technology, Karlsruhe, annual update

T 7.36 Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

Responsible: Dr. Gerd Gutekunst
Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture / 🗣	Wigger, Gutekunst
Exams					
WT 23/24	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger
ST 2024	790unbe	Basics of German Company Tax Law and Tax Planning			Wigger

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5 h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course “Öffentliche Einnahmen” beforehand.

Below you will find excerpts from events related to this course:

V Basics of German Company Tax Law and Tax Planning

2560134, WS 23/24, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Workload:
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 7.37 Course: Basics of Technical Logistics I [T-MACH-109919]

Responsible: Dr.-Ing. Martin Mittwollen
Dr.-Ing. Jan Oellerich

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	2

Events					
WT 23/24	2117095	Basics of Technical Logistics I	4 SWS	Lecture / Practice (/ 🗣	Mittwollen, Oellerich
Exams					
WT 23/24	76-T-MACH-109001	Basics of Technical Logistics I			Mittwollen
WT 23/24	76-T-MACH-109919	Basics of Technical Logistics I			Mittwollen

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge of the basics of technical mechanics preconditioned.

Below you will find excerpts from events related to this course:

V Basics of Technical Logistics I

2117095, WS 23/24, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- effect model of conveyor machines
- elements for the change of position and orientation
- conveyor processes
- identification systems
- drives
- mechanical behaviour of conveyors
- structure and function of conveyor machines
- elements of intralogistics
- sample applications and calculations in addition to the lectures inside practical lectures

Students are able to:

- Describe processes and machines of technical logistics,
- Model the fundamental structures and the impacts of material handling machines with mathematical models,
- Refer to industrially used machines
- Model real machines applying knowledge from lessons and calculate their dimensions.

Organizational issues
Die Erfolgskontrolle erfolgt in Form einer schritflichen oder mündlichen Prüfung (nach §4 (2), 1 bzw. 2SPO).
The assessment consists of a written or oral exam according to Section 4 (2), 1 or 2of the examination regulation.
Es wird Kenntnis der Grundlagen der Technischen Mechanik vorausgesetzt.
Basics knowledge of technical mechanics is preconditioned.
Ergänzungsblätter, Präsentationen,Tafel.
Supplementary sheets, presentations, blackboard.
Präsenz: 48Std
Nacharbeit: 132Std
presence: 48h
rework: 132h

Literature
Empfehlungen in der Vorlesung / Recommendations during lessons

T 7.38 Course: Basics of Technical Logistics II [T-MACH-109920]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	2

Events					
WT 23/24	2117098	Basics of Technical Logistics II	3 SWS	Lecture / Practice (/ 🗣	Oellerich
Exams					
WT 23/24	76-T-MACH-109002	Basics of Technical Logistics II			Hochstein, Mittwollen, Oellerich
WT 23/24	76-T-MACH-109920	Basics of Technical Logistics II			Hochstein, Mittwollen, Oellerich

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge of the basics of technical mechanics and out of "Basic of Technical Logstics I" (T-MACH-109919) preconditioned.

T 7.39 Course: Bayesian Statistics for Analyzing Data [T-WIWI-113471]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105714 - Consumer Research

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4,5	Grade to a third	Each summer term	1 terms	1

Events					
ST 2024	2500281	Bayesian Statistics for Analyzing Data	3 SWS	Lecture / 🗣	Scheibehenne

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment (assignments and active participation). Details will be communicated at the first day of class.

Annotation
Participation is limited to 10 participants. Registration is required for the course. If too many students register, students in higher semesters are selected first.

Below you will find excerpts from events related to this course:

V Bayesian Statistics for Analyzing Data

2500281, SS 2024, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Registration for this class is exclusively managed through the WiWi Portal (search for the title of the class: "Bayesian Statistics for Analyzing Data - 2500281")

Organizational issues
Participation is limited to 10 participants. Registration is required for the course. Registration for this class is exclusively managed through the WiWi Portal (search for the title of the class: "Bayesian Statistics for Analyzing Data - 2500281"). If too many students register, students in higher semesters are selected first.

T 7.40 Course: Behavioral Lab Exercise [T-WIWI-111806]

Responsible: Prof. Dr. Petra Nieken
Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	1

Events					
WT 23/24	2500040	Behavioral Lab Exercise	4.5 SWS	Seminar / 🗣	Scheibehenne, Nieken
Exams					
WT 23/24	7900368	Behavioral Lab Exercise			Nieken, Scheibehenne

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment.

Recommendation
This class caters towards Master students who are interested in empirical research and in running lab experiments.

Annotation
The course will be offered for the first time in the winter semester 21/22.

Due to the interactive nature of the class, the number of participants is limited. If you are interested, please contact the teachers directly via email.

Below you will find excerpts from events related to this course:

V Behavioral Lab Exercise

2500040, WS 23/24, 4.5 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback enabling them to improve their drafts for future research.

T 7.41 Course: Behavioral Lab Exercise [T-WIWI-113095]

Responsible: Prof. Dr. Petra Nieken
Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105714 - Consumer Research

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4,5	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	2500040	Behavioral Lab Exercise	4.5 SWS	Seminar / 🗣	Scheibehenne, Nieken
Exams					
WT 23/24	7900368	Behavioral Lab Exercise			Nieken, Scheibehenne

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment (presentation during the semester). Details will be communicated at the first day of class.

Annotation
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback, enabling them to improve their drafts for future research.

Below you will find excerpts from events related to this course:

V Behavioral Lab Exercise

2500040, WS 23/24, 4.5 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this class, students learn the core principles of psychological and economic experiments. The course covers topics ranging from design principles, to best-practices, preregistration, and analysis of the experimental data. Students will actively participate in the course by covering one selected topic in a talk. All students will discuss the topics together with the professors to develop solid knowledge about experimental design and analysis plans. In a second step, all students will develop a draft of an experimental design and analysis plan for their own topic and present it to the class. The students will get detailed feedback enabling them to improve their drafts for future research.

T 7.42 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I [T-MACH-100966]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 23/24	2141864	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 23/24	76-T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I			Guber

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam (75 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I

2141864, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
schriftliche Prüfung:

18.03.2024, 10:00 - 12:00; 30.46 Chemie, Neuer Hörsaal

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.43 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	2142883	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 23/24	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber
ST 2024	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II			Guber

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam (75 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II

Lecture (V) On-Site

2142883, SS 2024, 2 SWS, Language: German, Open in study portal

Content
Examples of use in Life-Sciences and biomedicine: Microfluidic Systems:
LabCD, Protein Cristallisation
Microarrys
Tissue Engineering
Cell Chip Systems
Drug Delivery Systems
Micro reaction technology
Microfluidic Cells for FTIR-Spectroscopy
Microsystem Technology for Anesthesia, Intensive Care and Infusion
Analysis Systems of Person´s Breath
Neurobionics and Neuroprosthesis
Nano Surgery

Organizational issues
Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

Prüfung:

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994

M. Madou
Fundamentals of Microfabrication

T 7.44 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III [T-MACH-100968]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	2142879	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	2 SWS	Lecture / 🗣	Guber, Ahrens
Exams					
WT 23/24	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber
ST 2024	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III			Guber

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam (75 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III

2142879, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Examples of use in minimally invasive therapy
Minimally invasive surgery (MIS)
Endoscopic neurosurgery
Interventional cardiology
NOTES
OP-robots and Endosystems
License of Medical Products and Quality Management

Organizational issues
Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

Prüfung:

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II;
Springer-Verlag, 1994

M. Madou
Fundamentals of Microfabrication

T 7.45 Course: Bond Markets [T-WIWI-110995]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2530560	Bond Markets	3 SWS	Lecture / Practice (/	Uhrig-Homburg, Molnar
Exams					
WT 23/24	7900311	Bond Markets			Uhrig-Homburg

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (75min.)

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Depending on further pandemic developments, the examination will be offered as an open-book examination (alternative exam assessment).

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V Bond Markets

2530560, WS 23/24, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture "Bond Markets" deals with the national and international bond markets, which are an important source of financing for companies, as well as for the public sector. After an overview of the most important bond markets, different yield definitions are discussed. Based on this, the concept of the yield curve is presented. In addition, the theoretical and empirical relationships between ratings, default probabilities and spreads are analyzed. The focus will then be on questions regarding the valuation, measurement, management and control of credit risks.

The total workload for this course is approximately 135 hours (4.5 credits).

The assessment consists of a written exam (75min.) (according to §4(2), 1 SPO). A bonus can be earned by correctly solving at least 50% of the posed bonus exercices. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Students deepen their knowledge of national and international bond markets. They gain knowledge of the traded instruments and their key figures for describing default risk such as ratings, default probabilities or credit spreads.

Organizational issues
Die Veranstaltung wird in der ersten Semesterhälfte an sechs Freitagen am Campus B (Geb. 09.21) im Raum 124 angeboten. Die Klausur findet dann direkt im Anschluss statt.

T 7.46 Course: Bond Markets - Models & Derivatives [T-WIWI-110997]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2530565	Bond Markets - Models & Derivatives	2 SWS	Block / 🗣	Grauer, Uhrig-Homburg
Exams					
WT 23/24	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of success consists in equal parts of a written thesis and an oral exam including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.

Recommendation
Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V Bond Markets - Models & Derivatives

2530565, WS 23/24, 2 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content

- **Competence Certificate:** The assessment of success consists in equal parts of a written thesis and an oral exam (according to §4(2), 3 SPO) including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** Students deepen their knowledge of national and international bond markets. They are able to apply the knowledge they have gained about traded instruments and common valuation models for pricing derivative financial instruments.
- **Prerequisites:**
- **Content:** The lecture "Bond Markets – Models & Derivatives" deepens the content of the lecture "Bond Markets". The modelling of the dynamics of yield curves and the management of credit risks forms the theoretical foundation for the valuation of interest rate and credit derivatives to be discussed. In this course, students deal intensively with selected topics and acquire the relevant knowledge on their own.
- **Recommendation:** Knowledge of "Bond Markets" and "Derivatives" courses is very helpful.
- **Workload:** The total workload for this course is approximately 90 hours (3.0 credits).

Organizational issues
Die Veranstaltung startet in der zweiten Semesterhälfte (Kickoff am 08.12.23) und hat Seminarcharakter - mit dem Ziel, ein selbstgewähltes Themenfeld in Form einer schriftlichen Ausarbeitung eigenständig zu erarbeiten.

T 7.47 Course: Bond Markets - Tools & Applications [T-WIWI-110996]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2530562	Bond Markets - Tools & Applications	1 SWS	Block / 🗣	Uhrig-Homburg, Grauer
Exams					
WT 23/24	7900317	Bond Markets - Tools & Applications			Uhrig-Homburg

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an empirical case study with written elaboration and presentation. The main examination is offered once a year, re-examinations every semester.

Recommendation
Knowledge of the "Bond Markets" course is very helpful.

Annotation
This course will be held in English.

Below you will find excerpts from events related to this course:

V Bond Markets - Tools & Applications

2530562, WS 23/24, 1 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content

- **Competence Certificate:** The assessment consists of an empirical case study with written elaboration and presentation (according to $4(2), 3 SPO). The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** The students apply various methods in practice within the framework of a project-related case study. They are able to deal with empirical data and analyze them in a targeted manner.
- **Content:** The course "Bond Markets – Tools & Applications" includes a hands-on project in the field of national and international bond markets. Using empirical datasets, the students have to apply practical methods in order to analyze the data in a targeted manner.
- **Recommendation:** Knowledge of the "Bond Markets" course is very helpful.
- **Workload:** The total workload for this course is approximately 45 hours (1.5 credits).

Organizational issues
Die Veranstaltung findet in der ersten Semesterhälfte statt (Kickoff am 10.11.23) und beinhaltet eine eigenständige Projektarbeit im Umgang mit realen Bond Daten. Die Erfolgskontrolle erfolgt anhand einer schriftlichen Ausarbeitung und einer kurzen Präsentation.

T 7.48 Course: Boosting of Combustion Engines [T-MACH-105649]

Responsible: Dr.-Ing. Johannes Kech
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
WT 23/24	2134153	Boosting of Combustion Engines	2 SWS	/ 🗣	Kech
ST 2024	2134153	Boosting of Combustion Engines and Fuel Cells	2 SWS	/ 🗣	Kech
Exams					
WT 23/24	76-T-MACH-105649	Boosting of Combustion Engines			Koch

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, 20 min

Prerequisites
none

T 7.49 Course: Business Data Analytics: Application and Tools [T-WIWI-109863]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-103118 - Data Science: Data-Driven User Modeling

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2540466	Business Data Analytics: Application and Tools	2 SWS	Lecture / 🗣	Knierim, Hariharan
ST 2024	2540467	Excercise Business Data Analytics: Application and Tools	1 SWS	Practice / 🗣	Grote

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is monitored through ongoing elaborations and presentations of tasks and a written exam (60 minutes) at the end of the lecture period. Successful participation in the exercises is a prerequisite for admission to the written examination. The scoring scheme for the overall evaluation will be announced at the beginning of the course.
The number of participants is limited to 50, as this is the only way to ensure conscientious support for the case study. The selection of participants is based on a short letter of motivation (max. 2000 characters including spaces) in the faculty's portal.

Prerequisites
None

Recommendation
Knowledge of (object-oriented) programming and statistics is helpful.

Annotation
The lecture is read in block sessions at the beginning of the semester. The dates will be communicated in the Wiwi-Portal.

Below you will find excerpts from events related to this course:

V Business Data Analytics: Application and Tools

2540466, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
als Blockveranstaltung an 3 Terminen:

- Montag, 22.04.24 - 08:00 - 17:00 Uhr,
- Dienstag, 23.04.24 - 08:00 - 17:00 Uhr,
- Mittwoch, 24.04.24 - 08:00 - 17:00 Uhr,

T 7.50 Course: Business Data Strategy [T-WIWI-106187]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2540484	Business Data Strategy	2 SWS	Lecture / 🗣	Weinhardt, van Dinther, Badewitz
WT 23/24	2540485	Übung zu Business Data Strategy	1 SWS	Practice / 🗣	Weinhardt, Badewitz, Schulz
Exams					
WT 23/24	7900234	Business Data Strategy			Weinhardt
ST 2024	7900267	Business data strategy			Weinhardt

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulationand an alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. The grade isdetermined by 2/3 through the written exam and by 1/3 through the alternative exam assessment (e.g., presentation).

Prerequisites
None

Recommendation
Students should be familiar with basic concepts of business organisations, information systems, and programming. However, all material will be introduced, so no formal pre-conditions are applied.

Annotation
Limited number of participants.

Below you will find excerpts from events related to this course:

V Business Data Strategy

2540484, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
With new methods for capturing and using different types of data and industry's recognition that society's use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making all add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense–making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications.

Organizational issues
Application/Registration

Attendance will be limited to 20-25 participants. Application/registration is therefore preliminary. After the application deadline has passed, positions will be allocated, based on evaluation of the previous study records. Applications are accepted only through the Wiwi-Portal: https://portal.wiwi.kit.edu/ys/5254

Anmeldung

Die Teilnehmeranzahl ist begrenzt (ca. 20-25 Plätze). Eine Anmeldung erfolgt deshalb zunächst unter Vorbehalt. Nach Ablauf der Anmeldefrist werden die Plätze zur Teilnahme, nach Einsicht der Vorleistungen im Studium vergeben. Die Anmeldung/Bewerbung erfolgt ausschließlich über das Wiwi-Portal: https://portal.wiwi.kit.edu/ys/5254

T 7.51 Course: Business Dynamics [T-WIWI-102762]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2540531	Business Dynamics	2 SWS	Lecture / 🗣	Geyer-Schulz, Glenn
WT 23/24	2540532	Exercise Business Dynamics	1 SWS	Practice / 🗣	Geyer-Schulz, Glenn
Exams					
WT 23/24	7979777	Business Dynamics (WS 2023/2024)			Geyer-Schulz
ST 2024	7900065	Business Dynamics (Nachklausur WS 2023/2024)			Geyer-Schulz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Business Dynamics

2540531, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
John D. Sterman. Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, 2000.

T 7.52 Course: Business Intelligence Systems [T-WIWI-105777]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101506 - Service Analytics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2540422	Business Intelligence Systems	3 SWS	Lecture /	Mädche, Gnewuch
Exams					
WT 23/24	7900224	Business Intelligence Systems			Mädche
ST 2024	7900149	Business Intelligence Systems			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
Basic knowledge on database systems is helpful.

Below you will find excerpts from events related to this course:

V **Business Intelligence Systems** — **Lecture (V)**
2540422, WS 23/24, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
In most modern enterprises, Business Intelligence & Analytics (BI&A) Systems represent a core enabler of decision-making in that they are supplying up-to-date and accurate information about all relevant aspects of a company's planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance. Modern BI&A systems leverage beyond reporting and dashboards also advanced analytical functions. Thus, today they also play a major role in enabling data-driven products and services. The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of BI&A Systems from a managerial and technical perspective.

The course is complemented with an engineering capstone project, where students work in a team with real-world use cases and data in order to create running Business intelligence & Analytics system prototypes.

Learning objectives

- Understand the theoretical foundations of key Business Intelligence & Analytics concepts supporting decision-making
- Explore key capabilities of state-of-the-art Business Intelligence & Analytics Systems
- Learn how to successfully implement and run Business Intelligence & Analytics Systems from multiple perspectives, e.g. architecture, data management, consumption, analytics
- Get hands-on experience by working with Business Intelligence & Analytics Systems with real-world use cases and data

Prerequisites
This course is limited to a capacity of 50 places. The capacity limitation is due to the attractive format of the accompanying engineering capstone project. Strong analytical abilities and profound skills in SQL as wells as Python and/or R are required. Students have to apply with their CV and transcript of records. All organizational details and the underlying registration process of the lecture and the capstone project will be presented in the first lecture. The teaching language is English.

Literature

- Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. "Decision Support and Business Intelligence Systems".
- Watson, H. J. 2014. "Tutorial: Big Data Analytics: Concepts, Technologies, and Applications," Communications of the Association for Information Systems (34), p. 24.
- Arnott, D., and Pervan, G. 2014. "A critical analysis of decision support systems research revisited: The rise of design science," Journal of Information Technology (29:4), Nature Publishing Group, pp. 269–293 (doi: 10.1057/jit.2014.16) .
- Carlo, V. (2009). "Business intelligence: data mining and optimization for decision making". Editorial John Wiley and Sons, 308-317.
- Chen, H., Chiang, R. H. L, and Storey, V. C. 2012. „Business Intelligence and Analytics: From Big Data to Big Impact," MIS Quarterly (36:4), pp. 1165-1188.
- Davenport, T. 2014. Big Data @ Work, Boston, MA: Harvard Business Review.
- Economist Intelligence Unit. 2015 "Big data evolution: Forging new corporate capabilities for the long term"
- Power, D. J. 2008. "Decision Support Systems: A Historical Overview," Handbook on Decision Support Systems, pp. 121–140 (doi: 10.1007/978-3-540-48713-5_7) .
- Sharma, R., Mithras, S., and Kankanhalli, A. 2014. „Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations," European Journal of Information Systems (23:4), pp. 433-441.
- Silver, M. S. 1991. "Decisional Guidance for Computer-Based Decision Support," MIS Quarterly (15:1), pp. 105-122.

Further literature will be made available in the lecture.

T 7.53 Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Competence Certificate
As of summer semester 2022, the course "Business Models in the Internet: Planning and Implementation" can no longer be taken. The exam will be offered in summer semester 2022 and winter semester 2022/23 for repeaters.

Prerequisites
None

Recommendation
None

T 7.54 Course: Business Planning [T-WIWI-102865]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 23/24	2545109	Business Planning for Founders	2 SWS	Seminar / 🗣	Martjan, Terzidis
ST 2024	2545109	Business Planning for Founders	2 SWS	Seminar / 🗣	Terzidis, Tittel, Rosales Bravo
Exams					
WT 23/24	7900023	Business Planning for Founders			Terzidis
ST 2024	7900234	Business Planning for Founders			Terzidis

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Business Planning for Founders

2545109, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Course Content:

In the course Business Planning for Founders, you will be working in interdisciplinary teams on a real-world challenge. The challenge for this semester will be about Chatbots and in the context of privacy risks. To solve the case, you will learn about human-centered design using design thinking methods. These methods will help you develop your own business idea. Building on your idea, you will deploy a business plan and finally present, as a team, the results on the pitch day in front of the seminar participants and a jury.

Information about the seminar:

ONLY ONE of the two options - Business Planning for founders OR Business Planning for founders in the field of IT-Security - can be taken and credited under the in CAS mentioned partial credit, as they cover similar content. Registration must take place in the CAS for the respective examination.

Target group: Master Student

Organizational issues
Registration is via the Wiwi-Portal.

In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation. The seminars will be held in English.

V Business Planning for Founders

2545109, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

Embark on a transformative journey into the dynamic realm of startup finance with our comprehensive course designed for Master's students interested in the task of aspiring to become future Chief Financial Officers (CFOs) or Chief Executive Officers (CEOs) in the startup. Particularly, students who previously attended classes on entrepreneurship or developed their business ideas in Design Thinking Seminars will work on the financial viability and, therefore, the potential for realizing their business ideas. The three-day seminar develops the financial literacy needed to start and operate an entrepreneurial venture, including analyzing and determining the cost and revenue structure of the firm and creating a financial strategy to execute the business plan successfully. Additionally, students will learn about the sources and conditions of different investment types and develop tailored fundraising strategies. The seminar is not restricted to the financial aspects but follows the Triple Bottom Line philosophy (3BL).

Throughout the course, real-world case studies and guest lectures, professional experts will provide valuable insights into the practical application of financial concepts.By the end of this course, you will be well-equipped to take on leadership roles in startups and startup ecosystems, armed with the managerial understanding required to drive success in dynamic and competitive markets.

Learning Objectives

Upon completion of this seminar, course participants will be able to

1. Analyze, forecast, and plan the cost structure and revenue streams of the venture project.
2. Reflect on the sustainability of a business based on the Triple Bottom Line theory.
3. Develop the essential financial statements for a startup.
4. Recall and reflect on investment strategies for startups.
5. Discover business stakeholders and prepare a tailored communication strategy.
6. Reflect on the role of information technology.
7. Apply negotiation techniques essential for securing favorable terms and agreements.
8. Have a brief overview of the related topic.

Credentials:

ONLY ONE of the two options - Business Planning for founders OR Business Planning for founders in the field of IT-Security - can be taken and credited under the in CAS mentioned partial credit, as they cover similar content. Registration must take place in the CAS for the respective examination.

Organizational issues
Wednesday, 05.06.2024
Wednesday, 19.06.2024
Wednesday, 17.07.2024

Registration is via the Wiwi-Portal.

In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation. The seminars will be held in English.

T 7.55 Course: Business Process Modelling [T-WIWI-102697]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2511210	Business Process Modelling	2 SWS	Lecture / 🗣	Oberweis
WT 23/24	2511211	Exercise Business Process Modelling	1 SWS	Practice / 🗣	Oberweis, Schüler
Exams					
WT 23/24	79AIFB_MvG_C2	Business Process Modelling			Oberweis
ST 2024	79AIFB_MvG_B4	Business Process Modelling (Registration until 15 July 2024)			Oberweis

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Business Process Modelling

2511210, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

Learning objectives:

Students

- describe goals of business process modeling and aplly different modeling languages,
- choose the appropriate modeling language according to a given context,
- use suitable tools for modeling business processes,
- apply methods for analysing and assessing process modells to evaluate specific quality characteristics of the process model.

Recommendations:

Knowledge of course Applied Informatics I - Modelling is expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karl: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.56 Course: Business Strategies of Banks [T-WIWI-102626]

Responsible: Prof. Dr. Wolfgang Müller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Competence Certificate
The lecture will be offered for the last time in the winter semester 2021/22. The exam will take place for the last time in the summer semester 2022 (only for repeaters).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be offered for the last time in the winter semester 2021/22.

T 7.57 Course: Case Studies Seminar: Innovation Management [T-WIWI-102852]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2545105	Case studies seminar: Innovation management	2 SWS	Seminar / 🗣	Weissenberger-Eibl
Exams					
WT 23/24	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Below you will find excerpts from events related to this course:

V Case studies seminar: Innovation management

2545105, WS 23/24, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course. A short introduction to presentation techniques is planned to help students prepare the seminar papers.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 7.58 Course: CATIA Advanced [T-MACH-105312]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	1

Events					
WT 23/24	2123380	Advanced CATIA	3 SWS	Project (P / ⛐	Ovtcharova, Mitarbeiter
ST 2024	2123380	CATIA advanced	3 SWS	Project (P / ⛐	Meyer, Mitarbeiter
Exams					
WT 23/24	76-T-MACH-105312	CATIA Advanced			Ovtcharova

Legend: 🖥 Online, ⛐ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Assessment of another type. Design project and written documentation in team work and final presentation. Grading: Project work 3/5, documentation 1/5 and presentation 1/5.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Advanced CATIA

2123380, WS 23/24, 3 SWS, Language: German/English, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
In this design project, students develop a product in small groups according to an agile approach using the 3DEXPERIENCE platform (CATIA V6) from Dassault Systèmes. The extended functionalities of the platform are addressed and model-based work is carried out.

The development process is traced from the idea to the finished model. The main focus is on independent solution finding, teamwork, function fulfillment, production and design. The project results are presented at the end of the semester.

Organizational issues
Siehe ILIAS zur Lehrveranstaltung

Literature
Keine / None

V CATIA advanced

2123380, SS 2024, 3 SWS, Language: German/English, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
In this design project, students develop a product in small groups according to an agile approach using the 3DEXPERIENCE platform (CATIA V6) from Dassault Systèmes. The extended functionalities of the platform are addressed and model-based work is carried out.

The development process is traced from the idea to the finished model. The main focus is on independent solution finding, teamwork, function fulfillment, production and design. The project results are presented at the end of the semester.

Organizational issues
Siehe ILIAS-Kurs.

Literature
Keine / None

T 7.59 Course: CATIA CAD Training Course [T-MACH-102185]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (practical)	2	pass/fail	Each term	2

Events					
WT 23/24	2123358	CATIA CAD training course	2 SWS	Practical course / 🧩	Ovtcharova, Mitarbeiter
ST 2024	2123358	CATIA CAD training course	2 SWS	Practical course / 🧩	Meyer, Mitarbeiter
Exams					
WT 23/24	76-T-MACH-102185	CATIA CAD Training Course			Ovtcharova

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Practical examination on CAD computer, duration: 60 min.

Prerequisites
None

Recommendation
Dealing with technical drawings is required.

Annotation
For the practical course attendance is compulsory.

Below you will find excerpts from events related to this course:

V CATIA CAD training course

2123358, WS 23/24, 2 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

Students are able to:

- create their own 3D geometric models in the CAD system CATIA and generate drawings due to the created geometry
- carry out FE-studies and kinematic simulations using the integrated CAE tools
- use advanced, knowledge-based functionalities of CATIA to automate the creation of geometry and thus to ensure the reusability of the models.

Organizational issues
Das Praktikum kann vorlesungsbegleitend absolviert werden oder als einwöchige Blockveranstaltung in der vorlesungsfreien Zeit. Weitere Informationen siehe ILIAS.

Literature
Praktikumskript

V

CATIA CAD training course

2123358, SS 2024, 2 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

Students are able to:

- create their own 3D geometric models in the CAD system CATIA and generate drawings due to the created geometry
- carry out FE-studies and kinematic simulations using the integrated CAE tools
- use advanced, knowledge-based functionalities of CATIA to automate the creation of geometry and thus to ensure the reusability of the models.

Organizational issues
Informationen zum Ablauf des Praktikums werden in einer Auftaktveranstaltung veröffentlicht. Hinweise hierzu siehe ILIAS.

Literature
Praktikumskript

T 7.60 Course: Ceramic Processing Technology [T-MACH-102182]

Responsible: Dr. Joachim Binder
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Competence Certificate
The assessment consists of an oral exam (approx. 20 min) taking place at the agreed date.

Auxiliary means: none

The re-examination is offered upon agreement.

Prerequisites
none

T 7.61 Course: Challenges in Supply Chain Management [T-WIWI-102872]

Responsible: Esther Mohr
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2550494	Challenges in Supply Chain Management	3 SWS	Lecture /	Mohr

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written paper and an oral exam of ca. 30-40 min.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Challenges in Supply Chain Management

2550494, SS 2024, 3 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / “Internet of Everything in production”, supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

Organizational issues
Bewerbung über das Wiwi-Portal möglich:

http://go.wiwi.kit.edu/ChallengesSCM

(Bewerbungszeitraum: 01.03.2024 - 18.03.2024)

Literature
Wird in Abhängigkeit vom Thema in den Projektteams bekanntgegeben.

T 7.62 Course: Characteristics of Transportation Systems [T-BGU-106609]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	6232806	Properties of Means of Transport	2 SWS	Lecture / 🗣	Vortisch
Exams					
WT 23/24	8240106609	Characteristics of Transportation Systems			Vortisch

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.63 Course: Civil Engineering Structures and Regenerative Energies [T-BGU-111922]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each term	1 terms	1

Events					
ST 2024	6241810	Civil Engineering Structures and Regenerative Energies	2 SWS	Lecture / Practice (/ 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 23/24	8240111922	Civil Engineering Structures and Regenerative Energies			Haghsheno

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.64 Course: CO2-Neutral Combustion Engines and their Fuels I [T-MACH-111550]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	5	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	2133113	CO2-neutral combustion engines and their fuels I	4 SWS	Lecture / Practice (/	Koch
Exams					
WT 23/24	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Kubach, Koch
ST 2024	76-T-MACH-102194	CO2-neutral combustion engines and their fuels I			Koch, Kubach

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V CO2-neutral combustion engines and their fuels I

2133113, WS 23/24, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Introduction, Presentation of IFKM
Working Principle
Characteristic Parameters
Engine Parts
Drive Train
Fuels
Gasoline Engines
Diesel Engines
Hydrogen Engines
Exhaust Gas Emissions

Organizational issues
Übungstermine Donnerstags nach Bekanntgabe in der Vorlesung

T 7.65 Course: CO2-Neutral Combustion Engines and their Fuels II [T-MACH-111560]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	1

Events					
ST 2024	2134151	CO2-neutral combustion engines and their fuels II	3 SWS	Lecture / Practice (/	Koch
Exams					
WT 23/24	76-T-MACH-104609	Combustion Engines, Hydrogen Engines and CO2 neutral Fuels II			Kubach, Koch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral examination, duration: 25 minutes, no auxiliary means

Prerequisites
none

Recommendation
Fundamentals of Combustion Engines II helpful

Below you will find excerpts from events related to this course:

V CO2-neutral combustion engines and their fuels II

2134151, SS 2024, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

T 7.66 Course: Collective Perception in Autonomous Driving [T-WIWI-113363]

Responsible: Prof. Dr. Alexey Vinel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2511456	Collective Perception in Autonomous Driving	2 SWS	Lecture /	Bied, Zhao , Vinel
ST 2024	2511457	Exercise Collective Perception in Autonomous Driving	1 SWS	Practice /	Bied, Zhao , Lucena
Exams					
ST 2024	79AIFB_CPAD_C3	Collective Perception in Autonomous Driving (Registration until 15 July 2024)			Vinel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The default assessment of this course is a written examination (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

T 7.67 Course: Communication Systems and Protocols [T-ETIT-101938]

Responsible: Dr.-Ing. Jens Becker
Prof. Dr.-Ing. Jürgen Becker

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2024	2311616	Communication Systems and Protocols	2 SWS	Lecture / 🗣	Becker, Becker
ST 2024	2311618	Tutorial for 2311616 Communication Systems and Protocols	1 SWS	Practice / 🗣	Stammler
Exams					
WT 23/24	7311616	Communication Systems and Protocols			Becker, Becker
ST 2024	7311616	Communication Systems and Protocols			Becker, Becker

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.68 Course: Competition in Networks [T-WIWI-100005]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2561204	Competition in Networks	2 SWS	Lecture /	Mitusch
WT 23/24	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice /	Wisotzky, Mitusch, Corbo
Exams					
WT 23/24	7900221	Competition in Networks			Mitusch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None.

Recommendation
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

Below you will find excerpts from events related to this course:

V Competition in Networks

2561204, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 7.69 Course: Computational Economics [T-WIWI-102680]

Responsible: Prof. Dr. Pradyumn Kumar Shukla
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	3

Events					
WT 23/24	2590458	Computational Economics (canceled)	2 SWS	Lecture /	Shukla
WT 23/24	2590459	Excercises to Computational Economics (canceled)	1 SWS	Practice /	Shukla
Exams					
ST 2024	79AIFB_CE_C6	Computational Economics (Registration until 15 July 2024)			Shukla

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Please note: the lecture will not take place in the winter semester 2023/2024. Also an exam cannot be offered.

Prerequisites
None

Annotation
The lecture is currently suspended. An exam cannot be offered.

Below you will find excerpts from events related to this course:

V Computational Economics (canceled)

2590458, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

Learning objectives:

The student

- understands the methods of Computational Economics and applies them on practical issues,
- evaluates agent models considering bounded rational behaviour and learning algorithms,
- analyses agent models based on mathematical basics,
- knows the benefits and disadvantages of the different models and how to use them,
- examines and argues the results of a simulation with adequate statistical methods,
- is able to support the chosen solutions with arguments and can explain them.

Literature

- R. Axelrod: "Advancing the art of simulation in social sciences". R. Conte u.a., Simulating Social Phenomena, Springer, S. 21-40, 1997.
- R. Axtel: "Why agents? On the varied motivations for agent computing in the social sciences". CSED Working Paper No. 17, The Brookings Institution, 2000.
- K. Judd: "Numerical Methods in Economics". MIT Press, 1998, Kapitel 6-7.
- A. M. Law and W. D. Kelton: "Simulation Modeling and Analysis", McGraw-Hill, 2000.
- R. Sargent: "Simulation model verification and validation". Winter Simulation Conference, 1991.
- L. Tesfation: "Notes on Learning", Technical Report, 2004.
- L. Tesfatsion: "Agent-based computational economics". ISU Technical Report, 2003.

Weiterführende Literatur:

- Amman, H., Kendrick, D., Rust, J.: "Handbook of Computational Economics". Volume 1, Elsevier North-Holland, 1996.
- Tesfatsion, L., Judd, K.L.: "Handbook of Computational Economics". Volume 2: Agent-Based Computational Economics, Elsevier North-Holland, 2006.
- Marimon, R., Scott, A.: "Computational Methods for the Study of Dynamic Economies". Oxford University Press, 1999.
- Gilbert, N., Troitzsch, K.: "Simulation for the Social Scientist". Open University Press, 1999.

T 7.70 Course: Computational Risk and Asset Management [T-WIWI-102878]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105032 - Data Science for Finance

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	5

Competence Certificate
The module examination takes the form of an alternative exam assessment.
The alternative exam assessment consists of a Python-based "Takehome Exam". At the end of the third week of January, the student is given a "Takehome Exam" which he processes and sends back independently within 4 hours using Python. Precise instructions will be announced at the beginning of the course. The alternative exam assessment can be repeated a maximum of once. A timely repeat option takes place at the end of the third week in March of the same year. More detailed instructions will be given at the beginning of the course.

Prerequisites
None.

Recommendation
Basic knowledge of capital markt theory.

T 7.71 Course: Computer Aided Data Analysis [T-GEISTSOZ-104565]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101169 - Sociology

Type	Credits	Grading scale	Version
Completed coursework	0	pass/fail	1

Events					
WT 23/24	5000058	Decompositions and regression methods	2 SWS	Course (/	Nollmann
WT 23/24	5000059	The gender wage gap	2 SWS	Course (/	Nollmann
WT 23/24	5011006	Computational Data Analysis: Network Analysis	2 SWS	Course (/	Staudt
WT 23/24	5011009	Computational data analysis: Data visualization and statistics using R	2 SWS	Course (/	Teutsch
ST 2024	5011018	Computational Social Science: Topics and positions in the German Parliament (Part 2)	2 SWS	Seminar /	Banisch
Exams					
WT 23/24	7400278	Computer Aided Data Analysis			Nollmann, Teutsch
WT 23/24	7400353	Computer Aided Data Analysis			Nollmann
ST 2024	7400369	Computer Aided Data Analysis			Nollmann

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Below you will find excerpts from events related to this course:

V Computational data analysis: Data visualization and statistics using R

5011009, WS 23/24, 2 SWS, Language: German, Open in study portal

Course (Ku)
On-Site

Content
This seminar is held in German. For additional information please visit the website in German.

V Computational Social Science: Topics and positions in the German Parliament (Part 2)

5011018, SS 2024, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The course consists of two parts (5011018 and 5011002) that are ideally taken in parallel.

Organizational issues
The course consists of two parts (5011018 and 5011002) that are ideally taken in parallel.

T 7.72 Course: Computer Contract Law [T-INFO-102036]

Responsible: Michael Menk
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 23/24	2411604	Computer Contract Law	2 SWS	Lecture / 🗣	Menk
Exams					
WT 23/24	7500065	Computer Contract Law			Sattler, Matz
ST 2024	7500066	Computer Contract Law			Sattler

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Computer Contract Law

2411604, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

Literature

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H.Beck, II. Aufl. 2002
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

Weiterführende Literatur

Ergänzende Literatur wird in den Vorlesungsfolien angegeben.

T 7.73 Course: Constitution and Properties of Protective Coatings [T-MACH-105150]

Responsible: Prof. Sven Ulrich
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2177601	Constitution and Properties of Protective Coatings	2 SWS	Lecture / 🗣	Ulrich
Exams					
WT 23/24	76-T-MACH-105150	Constitution and Properties of Protective Coatings			Ulrich

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (about 30 min)

no tools or reference materials

Prerequisites
none

Below you will find excerpts from events related to this course:

V Constitution and Properties of Protective Coatings

2177601, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
oral examination (about 30 min); no tools or reference materials

Teaching Content:

introduction and overview

concepts of surface modification

coating concepts

coating materials

methods of surface modification

coating methods

characterization methods

state of the art of industrial coating of tools and components

new developments of coating technology

regular attendance: 22 hours
self-study: 98 hours

Transfer of the basic knowledge of surface engineering, of the relations between constitution, properties and performance, of the manifold methods of modification, coating and characterization of surfaces.

Recommendations: none

Organizational issues
Falls die Vorlesung online stattfinden muss, bitte um Anmeldung unter sven.ulrich@kit.edu bis zum 23.10.23.

Den entsprechenden MS Teams Link erhalten Sie dann per E-Mail am 25.10.23.

Literature
Bach, F.-W.: Modern Surface Technology, Wiley-VCH, Weinheim, 2006

Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed

T 7.74 Course: Constitution and Properties of Wearresistant Materials [T-MACH-102141]

Responsible: Prof. Sven Ulrich
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
ST 2024	2194643	Constitution and Properties of Wear resistant materials	2 SWS	Lecture / 🗣	Ulrich
Exams					
WT 23/24	76-T-MACH-102141	Constitution and Properties of Wearresistant Materials			Ulrich

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (about 30 min)

no tools or reference materials

Prerequisites
none

Below you will find excerpts from events related to this course:

V Constitution and Properties of Wear resistant materials

2194643, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Teaching Content:

introduction

materials and wear

unalloyed and alloyed tool steels

high speed steels

stellites and hard alloys

hard materials

hard metals

ceramic tool materials

superhard materials

new developments

regular attendance: 22 hours
self-study: 98 hours

Basic understanding of constitution of wear-resistant materials, of the relations between constitution, properties and performance, of principles of increasing of hardness and toughness of materials as well as of the characteristics of the various groups of wear-resistant materials.

Recommendations: none

Organizational issues
Die Blockveranstaltung findet in folgendem Zeitraum statt:

15.04.-17.04.2024: jeweils von 8:00-16:00 Uhr;

Ort: KIT-CN, Geb. 681, Raum 214

Anmeldung verbindlich bis zum 13.04.2024 unter sven.ulrich@kit.edu.

Nach der Anmeldung wird Ihnen im Falle einer Online-Veranstaltung der Link zur Vorlesung per E-Mail am 14.04.2024 mitgeteilt.

Literature
Laska, R. Felsch, C.: Werkstoffkunde für Ingenieure, Vieweg Verlag, Braunschweig, 1981

Schedler, W.: Hartmetall für den Praktiker, VDI-Verlage, Düsseldorf, 1988

Schneider, J.: Schneidkeramik, Verlag moderne Industrie, Landsberg am Lech, 1995

Kopien der Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed

T 7.75 Course: Construction Equipment [T-BGU-101845]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6243701	Maschinentechnik	2 SWS	Lecture / 🗣	Gentes, Dörfler

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.76 Course: Control of Linear Multivariable Systems [T-ETIT-100666]

Responsible: Dr.-Ing. Mathias Kluwe
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101157 - Control Engineering II

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 23/24	2303177	Control of Linear Multivariable Systems	3 SWS	Lecture /	Kluwe
WT 23/24	2303179	Control of Linear Multivariable Systems (Tutorial to 2303177)	1 SWS	Practice /	Piscol
Exams					
WT 23/24	7303177	Control of Linear Multivariable Systems			Kluwe
ST 2024	7303177	Control of Linear Multivariable Systems			Kluwe

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Success is checked as part of a written overall test (120 minutes) of the course.

Prerequisites
none

Recommendation
For a deeper understanding, basic knowledge of system dynamics and control technology is absolutely necessary, as taught in the ETIT Bachelor module "System Dynamics and Control Technology" M-ETIT-102181.

T 7.77 Course: Control of Mobile Machines [T-MACH-111821]

Responsible: Simon Becker
Prof. Dr.-Ing. Marcus Geimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
A prerequisite for participation in the examination is the preparation of a semester report. The preexamination with the code T-MACH-111820 must be passed.

T 7.78 Course: Control of Mobile Machines – Prerequisites [T-MACH-111820]

Responsible: Simon Becker
Prof. Dr.-Ing. Marcus Geimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Competence Certificate
Preparation of a report on the completion of the semester task

Prerequisites
none

T 7.79 Course: Control Technology [T-MACH-105185]

Responsible: Hon.-Prof. Dr. Christoph Gönnheimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	2

Events					
ST 2024	2150683	Control Technology	2 SWS	Lecture / 🗣	Gönnheimer
Exams					
WT 23/24	76-T-MACH-105185	Control Technology			Gönnheimer
ST 2024	76-T-MACH-105185	Control Technology			Gönnheimer

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Control Technology** — **Lecture (V) On-Site**
2150683, SS 2024, 2 SWS, Language: German, Open in study portal

Content
The lecture control technology gives an integral overview of available control components within the field of industrial production systems.
The first part of the lecture deals with the fundamentals of signal processing and with control peripherals in the form of sensors and actors which are used in production systems for the detection and manipulation of process states.
The second part handles with the function of electric control systems in the production environment. The main focus in this chapter is laid on programmable logic controls, computerized numerical controls and robot controls. Finally the course ends with the topic of cross-linking and decentralization with the help of bus systems.
The lecture is very practice-oriented and illustrated with numerous examples from different branches.

The following topics will be covered:

- Signal processing
- Control peripherals
- Programmable logic controls
- Numerical controls
- Controls for industrial robots
- Distributed control systems
- Field bus
- Trends in the area of control technology

Learning Outcomes:

The students …

- are able to name the electrical controls which occur in the industrial environment and explain their function.
- can explain fundamental methods of signal processing. This involves in particular several coding methods, error protection methods and analog to digital conversion.
- are able to choose and to dimension control components, including sensors and actors, for an industrial application, particularly in the field of plant engineering and machine tools. Thereby, they can consider both, technical and economical issues.
- can describe the approach for projecting and writing software programs for a programmable logic control named Simatic S7 from Siemens. Thereby they can name several programming languages of the IEC 1131.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.80 Course: Convex Analysis [T-WIWI-102856]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 7.81 Course: Conveying Technology and Logistics [T-MACH-102135]

Responsible: Prof. Dr.-Ing. Kai Furmans
Paolo Pagani

Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
WT 23/24	2119100	Fördertechnik und Logistiksysteme		Seminar / 🗣	Furmans
ST 2024	2119100	Fördertechnik und Logistiksysteme		Seminar / 🗣	Furmans, Padhy
Exams					
WT 23/24	76-T-MACH-102135	Conveying Technology and Logistics			Furmans

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fördertechnik und Logistiksysteme

2119100, WS 23/24, SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues
Weiteres siehe Homepage

V Fördertechnik und Logistiksysteme

2119100, SS 2024, SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. Depending on the topic, the students can work on the either alone or in a group. At the end the results are presented and discussed with a final presentation. To prepare the work for the seminar an introductory event is scheduled at the beginning.

Organizational issues
Ort: Gebäude 50.38, Raum 0.22, Termine siehe homepage

T 7.82 Course: Cooperative Autonomous Vehicles [T-WIWI-112690]

Responsible: Prof. Dr. Alexey Vinel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2511450	Cooperative Autonomous Vehicles	2 SWS	Lecture /	Vinel
ST 2024	2511451	Exercise Cooperative Autonomous Vehicles	1 SWS	Practice /	Vinel
Exams					
WT 23/24	79AIFB_CAV_A3	Cooperative Autonomous Vehicles			Vinel
ST 2024	79AIFB_CAV_B5	Cooperative Autonomous Vehicles (Registration until 15 July 2024)			Vinel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The default assessment of this course is a written examination (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

T 7.83 Course: Copyright [T-INFO-101308]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	24121	Copyright	2 SWS	Lecture / 🗣	Sattler
Exams					
WT 23/24	7500064	Copyright			Sattler
ST 2024	7500064	Copyright			Sattler

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.84 Course: Corporate Compliance [T-INFO-101288]

Responsible: Andreas Herzig
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2400087	Corporate Compliance	2 SWS	Lecture / 🗣	Herzig, Siddiq
Exams					
WT 23/24	7500063	Corporate Compliance			Sattler, Matz
ST 2024	7500063	Corporate Compliance			Sattler

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.85 Course: Corporate Risk Management [T-WIWI-109050]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Exams			
WT 23/24	7900136	Corporate Risk Management	Ruckes

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.
Please note that the exam is only offered in the semester of the lecture as well as in the following semester.

Prerequisites
None

Recommendation
None

Annotation
The course will be held again in the summer term 2023 at the earliest. Please pay attention to the announcements on our website.

T 7.86 Course: Critical Information Infrastructures [T-WIWI-109248]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	4

Events					
WT 23/24	2511400	Critical Information Infrastructures	2 SWS	Lecture / 🗣	Sunyaev, Dehling, Jin
WT 23/24	2511401	Exercises to Critical Information Infrastructures	1 SWS	Practice / 🗣	Sunyaev, Dehling, Jin
Exams					
WT 23/24	7900067	Critical Information Infrastructures			Sunyaev

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The alternative exam assessment consists of

- the preparation of a written elaboration as well as
- an oral examination as part of a presentation of the work.

Details of the grades will be announced at the beginning of the course.

The examination is only offered to first-time students in the winter semester, but can be repeated in the following summer semester.

Prerequisites
None.

Annotation
New lecture from winter semester 2018/2019.

T 7.87 Course: Current Directions in Consumer Psychology [T-WIWI-111100]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105714 - Consumer Research

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4,5	Grade to a third	Each term	1 terms	2

Events					
WT 23/24	2540441	Current Directions in Consumer Psychology	2 SWS	Others (sons / 🏵)	Scheibehenne, Seidler, Liu
ST 2024	2540441	Current Directions in Consumer Psychology	2 SWS	Others (sons / 🗣)	Scheibehenne, Liu
Exams					
WT 23/24	7900357	Current Directions in Consumer Psychology			Scheibehenne

Legend: 💻 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment. Grading will be based on a continuous basis throughout the semester.

Prerequisites
Strong interest in research. Students who wish to write a master's thesis at our department will be given priority in the allocation of places.

Annotation
This class covers current research topics at the intersection between Psychology, Consumer Behavior, and Behavioral Economics. Based on weekly reading assignments of current scientific journal publications, students will get a first-hand experience of the ongoing topics and discussions at this exciting and dynamic area of research. The reading list will be announced at the first day of class and will be updated throughout the semester. Grades will be based on weekly participation throughout the semester including short oral presentation of papers in class, active engagement in discussions, and homework assignments. Due to the highly interactive format of this class the number of participants is limited.

Below you will find excerpts from events related to this course:

V Current Directions in Consumer Psychology

2540441, WS 23/24, 2 SWS, Language: English, Open in study portal

Others (sonst.)
Blended (On-Site/Online)

Content
NOTE: Wiwi-portal sign-up required

This class covers current research topics at the intersection between Psychology, Consumer Behavior, and Behavioral Economics. Based on weekly reading assignments of current scientific journal publications, students will get a first-hand experience of the ongoing topics and discussions at this exciting and dynamic area of research. The reading list will be announced at the first day of class. Grades will be based on continuous participation throughout the semester including short oral presentation of papers in class, active engagement in discussions and homework assignments. This class will be taught in English.

Organizational issues
Wiwi-portal sign-up required

V Current Directions in Consumer Psychology

2540441, SS 2024, 2 SWS, Language: English, Open in study portal

Others (sonst.)
On-Site

Content
NOTE: Wiwi-portal sign-up is required for joining this event. On-site presence in meetings mandatory.

This class covers current research topics at the intersection between Psychology, Consumer Behavior, and Behavioral Economics. Based on weekly reading assignments of current scientific journal publications, students will get a first-hand experience of the ongoing topics and discussions at this exciting and dynamic area of research. The reading list will be announced at the first day of class. Grades will be based on continuous participation throughout the semester including short oral presentation of papers in class, active engagement in discussions and homework assignments. This class will be taught in English.

Organizational issues
Wiwi-portal sign-up is required for joining this event. On-site presence in meetings mandatory.

T 7.88 Course: Current Topics on BioMEMS [T-MACH-102176]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
WT 23/24	2143873	Actual topics of BioMEMS	2 SWS	Seminar /	Guber, Ahrens
ST 2024	2143873	Actual topics of BioMEMS	2 SWS	Seminar /	Guber, Ahrens
Exams					
WT 23/24	76-T-MACH-102176	Current Topics on BioMEMS			Guber

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
active participation and own presentation (30 Min.)

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Actual topics of BioMEMS** **Seminar (S)**
2143873, WS 23/24, 2 SWS, Language: German, Open in study portal **Blended (On-Site/Online)**

Organizational issues
Wird bekannt gegeben

V **Actual topics of BioMEMS** **Seminar (S)**
2143873, SS 2024, 2 SWS, Language: German, Open in study portal **Blended (On-Site/Online)**

Content

- Short introduction to the basics of BioMEMS
- Selected aspects of biomedical engineering and life sciences
- Possible micro technical manufacturing processes
- Selected application examples from research and industry

The seminar includes (bio)medical engineering as well as biological and biotechnological topics in the context of engineering sciences

- Use of microtechnical components and systems in innovative medical products
- Use of microfluidic chip systems in applied biology and biotechnology

Organizational issues
Aktuell werden im Rahmen dieses Seminars nur Vorträge zu Abschlussarbeiten gehalten. Neue Themen nur auf Anfrage.

T 7.89 Course: Database Systems and XML [T-WIWI-102661]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2511202	Database Systems and XML	2 SWS	Lecture /	Oberweis
WT 23/24	2511203	Exercises Database Systems and XML	1 SWS	Practice /	Oberweis, Fritsch
Exams					
WT 23/24	79AIFB_DBX_A4	Database Systems and XML			Oberweis
ST 2024	79AIFB_DBX_A3	Database Systems and XML (Registration until 15 July 2024)			Oberweis

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Below you will find excerpts from events related to this course:

V **Database Systems and XML** — **Lecture (V)**
2511202, WS 23/24, 2 SWS, Language: German, Open in study portal — **Blended (On-Site/Online)**

Content
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

Note on the event format:

The course Database Systems and XML will be held in WS 23/24 in a "Flipped Classroom" format. Videos and supporting materials are provided for the lecture content, which students can work through independently and at their own pace. During the semester, interactive classroom sessions are held at regular intervals to practice and reinforce the lecture content.

Learning objectives:

Students

- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- M. Klettke, H. Meyer: XML & Datenbanken: Konzepte, Sprachen und Systeme. dpunkt.verlag 2003
- H. Schöning: XML und Datenbanken: Konzepte und Systeme. Carl Hanser Verlag 2003
- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- R. Elmasri, S. B. Navathe: Grundlagen der Datenbanksysteme. 2009
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.90 Course: Data-Driven Algorithms in Vehicle Technology [T-MACH-112126]

Responsible: Dr. Stefan Scheubner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	2113840	Data-Driven Algorithms in Vehicle Technology	2 SWS	Lecture /	Scheubner
Exams					
WT 23/24	7600001	Data-Driven Algorithms in Vehicle Technology			Scheubner
ST 2024	7600001	Data-Driven Algorithms in Vehicle Technology			Scheubner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

Below you will find excerpts from events related to this course:

V Data-Driven Algorithms in Vehicle Technology

2113840, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Course Syllabus: Data-Driven Algorithms in Vehicle Technology
Motivation for the Course: Nowadays, engineers often develop technical systems using a combination of hard- and software. This is true especially for modern passenger vehicle development. In a digitalized world, such developments are built on knowledge gained from relevant data sources, e.g. the vehicle sensors. Therefore, engineers in automobile technology need qualifications from data science to successfully create new functionalities in the cars. To prevent remaining purely theoretical, the algorithms in this course are explained using a real-world problem of “EV Routing”. Students have the opportunity to test methods in Python with frequent exercises presented.
Goal of the Course: Students have a basic understanding of data-driven algorithms such as Markov Models, Machine Learning or Monte-Carlo Methods. The approach for building data-driven models in automobile technology are known to students and they are able to test algorithms in the programming language “Python”. Furthermore, students have learnt how to analyse the algorithm performance.
Content:
1. Introduction to function development as well as the prerequisites for the course (e.g. Fundamentals for running Python code)
2. Fundamentals for EV Routing and relevant data sources
3. Parameter estimation and state classification algorithms to determine the current situation of the vehicle
4. Learning methods for driver behaviour
5. Forecast algorithms to predict future energy consumption of an electric vehicle

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Die erste VL am 24.10. um 14:00 Uhr findet in Präsenz am Campus Ost, Geb. 70.04, Raum 219 statt.

T 7.91 Course: Decentrally Controlled Intralogistic Systems [T-MACH-105230]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each term	4

Events					
WT 23/24	2117084	Decentrally controlled intralogistic systems	2 SWS	Practical course / 🗣	Furmans, Sperling, Arndt
ST 2024	2117084	Decentrally controlled intralogistic systems	2 SWS	Practical course / 🗣	Furmans, Sperling, Arndt, Enke, Schumacher, Pang

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Certificate through colloquium with presentation, documentation of the work results and fulfilment of the attendance requirement

Prerequisites
None

Recommendation
Basic knowledge of Python programming and basic knowledge of technical logistics of advantage

Below you will find excerpts from events related to this course:

V **Decentrally controlled intralogistic systems** — **Practical course (P) On-Site**
2117084, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
Proof:

- Certificate by colloquium with presentation

Note:

- Number of participants limited
- Participants will be selected
- Compulsory attendance

Media:

- Lego Mindstorms, PC

Teaching content:

- Introduction to material handling systems
- Construction of a model for decentralized logistic systems
- Object-oriented programming with LabView (or Python* with reservation)
- Implementation of the model with Mindstorms
- Presentation of the results

Learning objectives:

Students are able to:

- Model complex cinematic systems and use object-oriented programming for this purpose,
- Built experimental setups in a team for decentralized controlled intralogistic systems, choose appropriate system components and models and finally proof the function by using experiments.

Effort:

- Regular attendance: 90 hours (workplace is provided)
- Self-study: 30 hours

Dates and further information see homepage

Organizational issues
Termine im WS23/24:

Gruppe 1 05.02.- 23.02.2024, davon Präsenz: 05.02., 12.02. - 23.02.2024

Gruppe 2 19.02.- 08.03.2024, davon Präsenz: 19.02., 26.02. - 08.03.2024

Anmeldezeitraum:

01.11.2023 8:00 Uhr - 31.12.2023 18:00 Uhr (via Ilias-Kurs)

Literature
keine

V **Decentrally controlled intralogistic systems** **Practical course (P)**
2117084, SS 2024, 2 SWS, Language: German, Open in study portal **On-Site**

Content
Proof:

- Certificate by colloquium with presentation

Note:

- Number of participants limited
- Participants will be selected
- Compulsory attendance

Media:

- Lego Mindstorms, PC

Teaching content:

- Introduction to material handling systems
- Construction of a model for decentralized logistic systems
- Object-oriented programming with LabView (or Python* with reservation)
- Implementation of the model with Mindstorms
- Presentation of the results

Learning objectives:

Students are able to:

- Model complex cinematic systems and use object-oriented programming for this purpose,
- Built experimental setups in a team for decentralized controlled intralogistic systems, choose appropriate system components and models and finally proof the function by using experiments.

Effort:

- Regular attendance: 90 hours (workplace is provided)
- Self-study: 30 hours

Dates and further information see homepage

Organizational issues
Termin im SS24:

09.09.- 27.09.2024, davon Präsenz: 09.09., 16.09. - 27.09.2024

09.09.2024 14:00 Uhr Einführungsveranstaltung

Anmeldezeitraum:

01.04.2024 8:00 Uhr - 30.06.2024 18:00 Uhr (via Ilias-Kurs)

Literature
keine

T 7.92 Course: Demand-Driven Supply Chain Planning [T-WIWI-110971]

Responsible: Dr. Josef Packowski
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2550510	Demand-Driven Supply Chain Planning		Lecture / 🗣	Packowski
Exams					
WT 23/24	7900302	Demand-Driven Supply Chain Planning			Packowski

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

T 7.93 Course: Derivatives [T-WIWI-102643]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2530550	Derivatives	2 SWS	Lecture / 🗣	Uhrig-Homburg
ST 2024	2530551	Übung zu Derivate	1 SWS	Practice / 🗣	Dinger, Uhrig-Homburg
Exams					
WT 23/24	7900051	Derivatives			Uhrig-Homburg

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination or as an open-book examination (alternative exam assessment).

A bonus can be earned by correctly solving at least 50% of the posed bonus exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Derivatives

2530550, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Weiterführende Literatur:

Cox/Rubinstein (1985): Option Markets, Prentice Hall

T 7.94 Course: Design and Development of Mobile Machines [T-MACH-105311]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Jan Siebert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2113079	Design and Development of Mobile Machines	2 SWS	Lecture / 🗣	Geimer
Exams					
WT 23/24	76-T-MACH-105311	Design and Development of Mobile Machines			Geimer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A registration is mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines*. In case of too many applications, attendance will be granted based on pre-qualification.

The course will be replenished by interestung lectures of professionals from leading hydraulic companies.

Prerequisites
Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108887 must have been passed.

Recommendation
Knowledge in Fluid Power Systems (LV 2114093)

Annotation
After completion of the lecture, studens can:

- design working and travel drive train hydraulics of mobile machines and can derive characteristic key factors.
- choose and apply suitable state of the art designing methods succesfully
- analyse a mobile machines and break its structure down from a complex system to subsystems with reduced complexity
- identify and desrcibe interactions and links between subsystems of a mobile maschine
- present and document solutions of a technical problem according to R&D standards

The number of participants is limited.

Conent:

The working scenario of a mobile machine depends strongly on the machine itself. Highly specialised machines, e.g. pavers are also as common as universal machines with a wide range of applications, e.g. hydraulic excavators. In general, all mobile machines are required to do their intended work in an optimal way and satisfy various critera at the same time. This makes designing mobile machines to a great and interesting challenge. Nevertheless, usually key factors can be derived for every mobile machine, which affect all other machine parameters. During this lecture, those key factors and designing mobile machines accordingly will be adressed. To do so, an exemplary mobile machine will be discussed and designed in the lecture an as a semester project.

Literature:

See german recommendations

Below you will find excerpts from events related to this course:

V Design and Development of Mobile Machines — **Lecture (V) On-Site**
2113079, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
Wheel loaders and excavators are highly specialized mobile machines. Their function is to detach, pick up and deposit materials near by. Significant size for dimensioning of the machines is the content of their standard shovel. In this lecture the main steps in dimensioning a wheel loader or excavator are beeing thought. This includes among others:

- Defining the size and dimensions,
- the dimensioning of the electric drive train,
- the dimensioning of the primary energy supply,
- Determining the kinematics of the equipment,
- the dimension of the working hydraulics and
- Calculations of strength

The entire design process of these machines is strongly influenced by the use of standards and guidelines (ISO/DIN-EN). Even this aspect is dealt with.

The lecture is based on the knowledge from the fields of mechanics, strength of materials, machine elements, propulsion and fluid technique. The lecture requires active participation and continued collaboration.

Recommendations:

Knowledge in Fluid Technology (SoSe, LV 21093)

- regular attendance: 21 hours
- self-study: 99 hours

Literature
Keine.

T 7.95 Course: Design and Development of Mobile Machines - Advance [T-MACH-108887]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Jan Siebert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each term	1

Exams			
WT 23/24	76-T-MACH-108887	Design and Development of Mobile Machines - Advance	Geimer

Competence Certificate
Preparation of semester report

Prerequisites
none

T 7.96 Course: Design Basics in Highway Engineering [T-BGU-106613]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100998 - Design, Construction, Operation and Maintenance of Highways

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6200408	Design Basics in Highway Engineering	2 SWS	Lecture / 🗣	Plachkova-Dzhurova, Zimmermann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.97 Course: Design Thinking [T-WIWI-102866]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 23/24	2545008	Design Thinking (Track 1)	2 SWS	Seminar /	Jochem, Terzidis
ST 2024	2545008	Design Thinking (Track 1)	2 SWS	Seminar /	Bhargava, Jochem, Terzidis
Exams					
WT 23/24	7900084	Design Thinking (Track 1)			Terzidis
ST 2024	7900053	Design Thinking (Track 1)			Terzidis

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
None

Annotation
The seminar content will be published on the website of the institute.

Below you will find excerpts from events related to this course:

V Design Thinking (Track 1)

2545008, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Course Content:

Design Thinking is a user-centric innovation management method. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes are created and tested by the user group. The result is a proven and validated product.

Learning Objectives
During the seminar, the students learn basic procedures for achieving user-centric innovations. These are concrete methods that start with the potential user of certain products and services. The method is problem-oriented and emphasizes the specific customer situation. After attending the seminar, the students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

Registration is via the Wiwi portal.

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues
Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of 4-5 persons. The groups are formed in the seminar

V

Design Thinking (Track 1)

2545008, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

Design Thinking is a user-centric innovation management method. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes are created and tested by the user group. The result is a proven and validated product.

Learning Objectives

During the seminar, the students learn basic procedures for achieving user-centric innovations. These are concrete methods that start with the potential user of certain products and services. The method is problem-oriented and emphasizes the specific customer situation. After attending the seminar, the students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

Credentials:

ATTENTION: Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.

Organizational issues
Registration is via the Wiwi-Portal.

T 7.98 Course: Designing Interactive Systems: Human-AI Interaction [T-WIWI-113465]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2540558	Designing Interactive Systems: Human-AI Interaction	3 SWS	Lecture /	Mädche, Seitz

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-108461 - Interactive Information Systems must not have been started.
2. The course T-WIWI-110851 - Designing Interactive Systems must not have been started.

Annotation
The course is held in english.

Below you will find excerpts from events related to this course:

V Designing Interactive Systems: Human-AI Interaction

2540558, SS 2024, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Description

Computers have evolved from batch processors towards highly interactive systems. With the rapid progress in the field of artificial intelligence, computers can now learn and adapt to their environment, simulate human intelligence processes as well as support or even take over tasks from humans. This offers great possibilities, but at the same time raises new challenges for the successful design of interactive systems.

The aim of this course is to introduce advanced concepts and theories as well as current practice of designing interactive systems. A specific focus is set on designing AI-based interactive systems for individuals and groups at work ranging from personal productivity assistants to AI-augmented virtual collaboration.

The course is complemented with hands-on exercises and a design capstone project in cooperation with an industry partner. In the project, students in a team effort apply state-of-the-art design methods & techniques and create an interactive system design prototype with a specific focus on human-AI interaction.

Learning objectives

- Explain what interactive systems are and how they can be conceptualized
- Describe the unique characteristics of human-AI interaction and their impact on designing interactive systems
- Understand the human-centered design process and know how to apply corresponding methods and tools
- Understand the concepts and theoretical foundations that guide the design of interactive systems
- Know key concepts, design principles and design methods for contemporary interactive systems focusing on on human-AI interaction
- Get hands-on experience by applying lecture content in a design capstone project

Prerequisites

No specific prerequisites are required for the lecture

Literature

Die Vorlesung basiert zu einem großen Teil auf

· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.

Weiterführende Literatur wird in der Vorlesung bereitgestellt.

T 7.99 Course: Development of Hybrid Drivetrains [T-MACH-110817]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2134155	Development of Hybrid Powertrains	2 SWS	Lecture / 🗣	Koch, Doppelbauer
Exams					
WT 23/24	76-T-MACH-110817	Development of hybrid drivetrains			Koch

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 1 hour

Prerequisites
None

Below you will find excerpts from events related to this course:

V Development of Hybrid Powertrains

2134155, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction and Goal
2. Alternative Powertrains
3. Fundamentals of Hybrid Powertrains
4. Fundamentals of Electric Components of Hybrid Powertrains
5. Interactions in Hybrid Powertrain Development
6. Overall System Optimization

T 7.100 Course: Development of Sustainable Business Models [T-WIWI-112143]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 23/24	2500043	Development of Sustainable Business Models	3 SWS	Seminar / 🗣	Duwe
Exams					
WT 23/24	7900050	Development of Sustainable Business Models			Weissenberger-Eibl
WT 23/24	7900345	Development of Sustainable Digital Business Models			Weissenberger-Eibl

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Non exam assessment. The final grade is composed 50% of the grade of the written paper (ca. 5 Pages /Person) and 50% of the presentation of the results.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

T 7.101 Course: Digital Democracy [T-WIWI-113160]

Responsible: Jonas Fegert
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101446 - Market Engineering
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-103118 - Data Science: Data-Driven User Modeling

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4,5	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	00052	Digital Democracy	2 SWS	Lecture /	Fegert
WT 23/24	00053	Übung zur Digital Democracy	1 SWS	Practice /	Fegert
Exams					
WT 23/24	00059	Digital Democracy			Weinhardt

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The examination consists of two parts (presentation and oral exam). Details on the design of the exam will be announced at the beginning of the course.

Annotation
Limited to 25 students. Application (cover letter) via the Wiwi-portal.

Below you will find excerpts from events related to this course:

V Digital Democracy

00052, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The "Digital Democracy" Lecture deals with opportunities and challenges of democracy and participation in a digitalized world. Social networks and other platforms have become a central place for human interaction.

These technologies open up many possibilities to connect people, promote societal discourse, and organize social movements. On the other hand, they are also used to undermine democracy by extremist forces.

One example is the spread of disinformation through social media, which can undermine trust in democratic institutions and exacerbate divisions in society. Big tech actors pursue their own economically driven interests, some of which run counter to societal ones.

So to what extent can Internet platforms help strengthen social discourse? And what measures can be taken to promote the quality and diversity of discourse in the digital world? What role do big tech players play in digital democracy and how can their interests be reconciled with democratic principles? These and many more questions will be explored in the lecture. The lecture introduces theoretical foundations and evidence-based research on digital democracy. It will address the following questions: What characterizes deliberative democracies, how do democracies change, and what can damage them? How does social polarization emerge and what drives it - off- and online. Accordingly, different platform types and phenomena of disinformation, such as clickbait, will be presented. The last part of the lecture series will deal with the search for approaches and alternatives to these problems.

Organizational issues
Beschränkung auf 25 Plätze mit Bewerbung per kurzem Motivationschreiben (ab Anfang/Mitte September über das Wiki-Portal)

T 7.102 Course: Digital Health [T-WIWI-109246]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2511402	Digital Health	2 SWS	Lecture /	Sunyaev, Thiebes, Schmidt-Kraepelin
Exams					
WT 23/24	7900068	Digital Health			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (written elaboration, presentation, peer review, oral participation) according to §4(2),3 of the examination regulation. Details of the grading will be announced at the beginning of the course. The examination is only offered to first-time writers in the winter semester, but can be repeated in the following summer semester.

Prerequisites
None.

T 7.103 Course: Digital Marketing [T-WIWI-112693]

Responsible: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2571185	Digital Marketing	2 SWS	Lecture / 🗣	Kupfer
ST 2024	2571186	Digital Marketing Exercise	1 SWS	Practice / 🗣	Daumann
Exams					
ST 2024	7900064	Digital Marketing			Kupfer
ST 2024	7900070	Digital Marketing			Kupfer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The control of success is done by the elaboration and presentation of a group task as well as a written exam. Further details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Students are highly encouraged to actively participate in class.

Below you will find excerpts from events related to this course:

V Digital Marketing

2571185, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn the theoretical foundations of digital marketing and its most important concepts. They develop an understanding both for the digital consumer and the digital environment. Special emphasis will be given to digital marketing strategies and practices, such as content marketing and influencer marketing. A tutorial offers the opportunity to apply the key learnings of the lecture as part of a group work.

The learning objectives are as follows:

- Getting to know the theoretical foundations of digital marketing
- Evaluating digital marketing strategies and practices (e.g., in the context of content marketing and influencer marketing)
- Fostering critical and analytical thinking skills and the application of knowledge to marketing problems
- Improving English skills

Total time required for 4.5 credit points: approx. 135 hours
Attendance time: 30 hours
Self-study: 105 hours

Organizational issues
Termine werden bekannt gegeben.

T 7.104 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsible: Prof. Dr. Martin Klarmann
Anja Konhäuser

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105312 - Marketing and Sales Management
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each summer term	1

Events					
ST 2024	2571156	Digital Marketing and Sales in B2B	1 SWS	Others (sons / 🗣	Konhäuser

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

Prerequisites
None.

Annotation
This course will not take place in the summer term 2023, but is expected to be offered again on a regular basis starting in the summer term 2024.
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).Please note that only one of the 1.5-ECTS courses can be attended in this module.

Below you will find excerpts from events related to this course:

V Digital Marketing and Sales in B2B

2571156, SS 2024, 1 SWS, Language: English, Open in study portal

Others (sonst.)
On-Site

Content
Learning Sessions:

The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.
Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g. product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:

After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

- Understand digital marketing and sales approaches for the B2B sector
- Recognise important elements and understand how-to-setup of digital strategies
- Become familiar with the effectiveness and usage of different digital marketing channels
- Understand the effect of digital sales on sales management, customer support and value chain
- Be able to measure and interpret digital KPIs
- Calculate the Return on Investment (RoI) for digital marketing by combining online data with company performance data

time of presentness = 15 hrs.

private study = 30 hrs.

Organizational issues
Blockveranstaltung, Raum 115, Geb. 20.21, Termine werden noch bekannt gegeben

Literature
-

T 7.105 Course: Digital Services: Innovation & Business Models [T-WIWI-112757]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101448 - Service Management
M-WIWI-102754 - Service Economics and Management
M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2595468	Digital Services: Innovation & Business Models	1.5 SWS	Lecture /	Satzger, Benz, Schüritz, Heinz
ST 2024	2595469	Übung zu Digital Services: Innovation & Business Models	1.5 SWS	Practice /	Satzger, Benz, Schüritz, Heinz
Exams					
WT 23/24	7900215	Digital Services: Innovation & Business Models - oral			Satzger
WT 23/24	7900291	Digital Services: Innovation & Business Models (Nachklausur am 4.12.2023)			Satzger
ST 2024	7900222	Digital Services: Innovation & Business Models			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 min.).

Prerequisites
None

Recommendation
None

Annotation
The course Digital Services: Innovation & Business Models replaces the course Service Innovation based on a revised course concept and content. The focus will be on the closer integration of the topics of service innovation and digitalization. Previous foundational content (e.g., on service innovation challenges or human-centered innovation methods) will remain. New content will cover topics such as digital platforms and ecosystems, IoT and smart service innovation, and business models.

Below you will find excerpts from events related to this course:

V Digital Services: Innovation & Business Models

2595468, SS 2024, 1.5 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Leveraging data and digital technologies for business success is a key challenge for organizations as they need to

- get aware of the newly arising potential
- develop suitable digital services that are user-centric and individualized
- "servitize" their offering portfolio and business model
- transform their organizations

This course will equip students with concepts and methods to tackle this challenge along two dimensions: First, we will cover innovation as a concept as well as apply contemporary innovation methods (like Design Thinking, Open Innovation) to the services space. Second, we deal with leveraging innovation to develop new business models (including multi-partner concepts in platforms or ecosystems), to servitize existing business models (e.g., via product-service-systems), and to accordingly transform the organization.

The course links innovation and business model theories with practical examples and exercises. Students are asked to actively engage in the discussion.

Organizational issues
The course will be offered in the form of a flipped classroom concept. The lecture will be recorded in advance and made available online. During the "in presence" sessions, the contents of the lecture will be applied and expanded on.

Literature

- Böhmann, T./ Leimeister, J.M./ Möslein, K. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79.
- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.) (2015). Fundamentals of service systems (Vol. 12). Heidelberg: Springer.
- Chesbrough, H. (2011). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons.
- Rogers, S. (2003). Diffusion of Innovations. 5. ed. New York: Free Press.
- Satzger, G., Benz, C., Böhmann, T., Roth, A. (2022). Servitization and Digitalization as Siamese Twins – Concepts and Research Agenda. Edvardsson/Tronvoll (eds.): The Palgrave Handbook of Service Management, 967-989.
- Uebernickel, F., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2015). Design Thinking: Das Handbuch. Frankfurt am Main: Frankfurter Allgemeine Buch.
- Vargo, S.L., Lusch, R.F. (2017). Service-dominant logic 2025. Int. J. Res. Mark. 34, 46–67.
- Weill, P.; Woerner, S.L. (2018): "What's your Digital Business Model? – Six Questions to Help you Build the Next-Generation Enterprise". Boston, Massachusetts: Harvard Business Review Press.

V Übung zu Digital Services: Innovation & Business Models

Practice (Ü)
On-Site

2595469, SS 2024, 1.5 SWS, Language: English, Open in study portal

Content
Leveraging data and digital technologies for business success is a key challenge for organizations as they need to

- get aware of the newly arising potential
- develop suitable digital services that are user-centric and individualized
- "servitize" their offering portfolio and business model
- transform their organizations

This course will equip students with concepts and methods to tackle this challenge along two dimensions: First, we will cover innovation as a concept as well as apply contemporary innovation methods (like Design Thinking, Open Innovation) to the services space. Second, we deal with leveraging innovation to develop new business models (including multi-partner concepts in platforms or ecosystems), to servitize existing business models (e.g., via product-service-systems), and to accordingly transform the organization.

The course links innovation and business model theories with practical examples and exercises. Students are asked to actively engage in the discussion.

Organizational issues
The course will be offered in the form of a flipped classroom concept. The lecture will be recorded in advance and made available online. During the "in presence" sessions, the contents of the lecture will be applied and expanded on.

Literature

- Böhmann, T./ Leimeister, J.M./ Möslein, K. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79.
- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.) (2015). Fundamentals of service systems (Vol. 12). Heidelberg: Springer.
- Chesbrough, H. (2011). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons.
- Rogers, S. (2003). Diffusion of Innovations. 5. ed. New York: Free Press.
- Satzger, G., Benz, C., Böhmann, T., Roth, A. (2022). Servitization and Digitalization as Siamese Twins – Concepts and Research Agenda. Edvardsson/Tronvoll (eds.): The Palgrave Handbook of Service Management, 967-989.
- Uebernickel, F., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2015). Design Thinking: Das Handbuch. Frankfurt am Main: Frankfurter Allgemeine Buch.
- Vargo, S.L., Lusch, R.F. (2017). Service-dominant logic 2025. Int. J. Res. Mark. 34, 46–67.
- Weill, P.; Woerner, S.L. (2018): "What's your Digital Business Model? – Six Questions to Help you Build the Next-Generation Enterprise". Boston, Massachusetts: Harvard Business Review Press.

T 7.106 Course: Digital Transformation and Business Models [T-WIWI-108875]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation). The final grade is composed 75% of the grade of the written paper and 25% of the presentation.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

T 7.107 Course: Digitalization from Production to the Customer in the Optical Industry [T-MACH-110176]

Responsible: Dr.-Ing. Marc Wawerla
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each winter term	4

Events					
WT 23/24	2149701	Digitalization from Production to the Customer in the Optical Industry	2 SWS	Lecture / 🗣	Wawerla
Exams					
WT 23/24	76-T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry			Wawerla

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative test achievement (graded):
- Written processing of a case study (weighting 50%) and
- Presentation of the results (ca. 10 min.) followed by a colloquium (ca. 30 min.), (weighting 50%)

Prerequisites
none

Annotation
For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Further information for application can be found via: https://www.wbk.kit.edu/english/education.php.

Below you will find excerpts from events related to this course:

V Digitalization from Production to the Customer in the Optical Industry

2149701, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture deals with Digitalization along the entire value chain end-to-end, with a focus on production and supply chain. Within this context, concepts, tools, methods, technologies and concrete applications in the industry are presented. Furthermore, the students get the opportunity to get first-hand insights into the digitalization journey of a German technology company.

Main topics of the lecture:

- Concepts and methods such as disruptive innovation and agile project management
- Overview on technologies at disposal
- Practical approaches in innovation
- Applications in industry
- Field trip to ZEISS

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are able to analyze and evaluate the suitability of digitalization technologies in the optical industry.
- are able to assess the applicability of methods such as disruptive innovation and agile project management.
- are able to appreciate the practical challenges to digitalization in industry.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Aus organisatorischen Gründen ist die Teilnehmeranzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Weitere Informationen zur Bewerbung sind unter https://www.wbk.kit.edu/studium-und-lehre.php zu finden.

For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Further information for application can be found via:
https://www.wbk.kit.edu/english/education.php.

T 7.108 Course: Digitalization in Facility and Real Estate Management [T-BGU-108941]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105592 - Digitalization in Facility Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
WT 23/24	6242907	Digitization in Facility- and Real Estate Management	4 SWS	Lecture / Practice (/	Lennerts, Mitarbeiter/ innen
Exams					
WT 23/24	8246108941	Digitalization in Facility and Real Estate Management			Lennerts, Schmidt-Bäumler

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
project work incl. report, appr. 15 pages, and presentation/colloquium, appr. 15 min

Prerequisites
none

Recommendation
none

Annotation
none

T 7.109 Course: Digitization in the Railway System [T-MACH-113016]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106496 - Modern Mobility on Rails and Roads

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	4,5	Grade to a third	Each winter term	1 terms	2

Events					
WT 23/24	2115920	Railway System Digitalisation	2 SWS	Lecture / 🗣	Cichon
Exams					
WT 23/24	76-T-MACH-106426	Railway System Digitalisation			Cichon

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral examination
Duration: approx. 20 minutes
No tools or reference material may be used during the exam.

T 7.110 Course: Disassembly Process Engineering [T-BGU-101850]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6243803	Dismantling Techniques	2 SWS	Lecture / Practice (/ 🗣	Gentes
Exams					
WT 23/24	8240101850	Disassembly Process Engineering			Gentes
ST 2024	8240101850	Disassembly Process Engineering			Gentes

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.111 Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

Responsible: Hon.-Prof. Dr. Sven Spieckermann
Organisation: KIT Department of Economics and Management
Part of: M-MACH-104888 - Advanced Module Logistics
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2550488	Ereignisdiskrete Simulation in Produktion und Logistik	3 SWS	Lecture / 🗣	Spieckermann
Exams					
ST 2024	7900244	Discrete-Event Simulation in Production and Logistics			Spieckermann

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written paper and an oral exam of about 30-40 min (alternative exam assessment).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is planned to be held every summer term.

The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Ereignisdiskrete Simulation in Produktion und Logistik

2550488, SS 2024, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

Organizational issues
Den Bewerbungszeitraum finden Sie auf der Veranstaltungswebseite im Lehre-Bereich unter dol.ior.kit.edu

Literature

- Gutenschwager K., Rabe M., Spieckermann S. und S. Wenzel (2017): Simulation in Produktion und Logistik, Springer, Berlin.
- Banks J., Carson II J. S., Nelson B. L., Nicol D. M. (2010) Discrete-event system simulation, 5.Aufl., Pearson, Upper Saddle River.
- Eley, M. (2012): Simulation in der Logistik - Einführung in die Erstellung ereignisdiskreter Modelle unter Verwendung des Werkzeuges "Plant Simulation“, Springer, Berlin und Heidelberg
- Kosturiak, J. und M. Gregor (1995): Simulation von Produktionssystemen. Springer, Wien und New York.
- Law, A. M. (2015): Simulation Modeling and Analysis. 5th Edition, McGraw-Hill, New York usw.
- Liebl, F. (1995): Simulation. 2. Auflage, Oldenbourg, München.
- Noche, B. und S. Wenzel (1991): Marktspiegel Simulationstechnik. In: Produktion und Logistik. TÜV Rheinland, Köln.
- Pidd, M. (2004): Computer Simulation in Management Science. 5th Edition, Wiley, Chichester.
- Robinson S (2004) Simulation: the practice of model development and use. John Wiley & Sons, Chichester
- VDI (2014): Simulation von Logistik-, Materialfluß- und Produktionssystemen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

T 7.112 Course: Drive Train of Mobile Machines [T-MACH-105307]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Marco Wydra

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2113077	Drive Train of Mobile Machines	2 SWS	Lecture / 🗣	Geimer
WT 23/24	2113078	Übung zu 'Antriebsstrang mobiler Arbeitsmaschinen'	1 SWS	Practice / 🗣	Geimer, Bargen-Herzog
Exams					
WT 23/24	76-T-MACH-105307	Drive Train of Mobile Machines			Geimer

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The final assessment will be an oral examination (20 min) taking place during the recess period. The examination will be offered in ervery semester and can be repeated at any regular examination date.

Prerequisites
none

Recommendation

- General principles of mechanicals engineering
- Basic knowledge of hydraulics
- Interest in mobile machinery

Annotation
At the end of the lecture, participants can explain the structure and function of all discussed drive trains of mobile machines. They can analyze complex gearbox schematics and synthesize simple transmission functions using rough calculations.

Content:

In this course the different drive trains of mobile machinery will be discussed. The focus of this course is:

- mechanical gears
- torque converter
- hydrostatic drives
- power split drives
- electrical drives
- hybrid drives
- axles
- terra mechanics

Media: projector presentation

Literature: Download of lecture slides from ILIAS. Further literature recommendations during lectures.

Below you will find excerpts from events related to this course:

V **Drive Train of Mobile Machines** — **Lecture (V) On-Site**
2113077, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
In this course will be discussed the different drive train of mobile machinerys. The fokus of this course is:
- improve knowledge of fundamentals
- mechanical gears
- torque converter
- hydrostatic drives
- continuous variable transmission
- eletrical drives
- hybrid drives
- axles
- terra mechanic

Recommendations:

- general basics of mechanical engineering
- basic knowledge in hydraulics
- interest in mobile machines

- regular attendance: 21 hours
- self-study: 89 hours

Literature
Skriptum zur Vorlesung downloadbar über ILIAS

T 7.113 Course: Drying of Dispersions [T-CIWVT-111433]

Responsible: Prof. Dr.-Ing. Heike Karbstein
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each summer term	2

Events					
ST 2024	2211030	Trocknen von Dispersionen	1 SWS	Lecture / ✕	Leister, Karbstein

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

T 7.114 Course: Dynamic Macroeconomics [T-WIWI-109194]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation and Growth
M-WIWI-101496 - Growth and Agglomeration
M-WIWI-101497 - Agglomeration and Innovation

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 23/24	2560402	Dynamic Macroeconomics	2 SWS	Lecture /	Brumm
WT 23/24	2560403	Übung zu Dynamic Macroeconomics	1 SWS	Practice /	Hußmann
Exams					
WT 23/24	7900261	Dynamic Macroeconomics			Brumm

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment is a written exam (60 min.).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Dynamic Macroeconomics

2560402, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
This course addresses macroeconomic questions on an advanced level. The main focus of this course is on dynamic programming and its fundamental role in modern macroeconomics. In the first part of the course, the necessary mathematical tools are introduced as well as basic applications in labor economics, economic growth and business cycle analysis. In the second part of the course, these basic models are expanded to incorporate household heterogeneity in various forms: Models of economic inequality to analyze the distributional impact of tax policies and models of overlapping generations to analyze the impact of social security reforms or changes in government debt. Finally, advanced methods based on sparse grids or neural nets are introduced to solve high-dimensional models. The course pursues a hands-on approach so that students not only gain theoretical insights but also learn numerical tools to solve dynamic economic models using the programming language Python.

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 7.115 Course: Dynamic Systems of Technical Logistics [T-MACH-112113]

Responsible: Dr.-Ing. Martin Mittwollen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each summer term	1

Events					
ST 2024	2148605	Dynamic Systems of Technical Logistics	4 SWS	Lecture / Practice (/ 🗣	Mittwollen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (approx. 20min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge out of **Basics of Technical Logistics -I** (LV 2117095) preconditioned.

Knowledge out of **Basics of Technical Logistics-II** (LV 2117098) recommended.

Below you will find excerpts from events related to this course:

V Dynamic Systems of Technical Logistics

2148605, SS 2024, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Conveyor technology = motion = dynamics

Insight into the structure, mode of operation, dynamics and safety of materials handling equipment along the process chain of technical logistics from raw material extraction through processing, distribution, storage and order picking to shipping.
Bulk material mining, transport, handling, storage
Stability and tipping safety when turning, slewing, driving cranes
Overhead cranes - structure, dynamics, safety
Conveyors in material handling systems (belt, chain, AGV, EMS, ...)
Elevators - structure, dynamics, safety
Material flow systems - structure, basic elements, information flow
Storage and racking systems - structure, dynamics, order picking
Storage and retrieval systems - structure, dynamics, safety

Organizational issues
DSTL und DSTL-P sind zeitlich so gegliedert, dass zunächst unter Hinzunahme des Donnerstags-Zeitslots für das Projekt ausschließlich der Vorlesungs- und Übungsteil bis ca. Ende Juni gehalten wird. Der anschließende Zeitraum ist ausschließlich für die (optionale) Projektarbeit vorgesehen.

T 7.116 Course: Dynamic Systems of Technical Logistics - Project [T-MACH-112114]

Responsible: Dr.-Ing. Martin Mittwollen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	1

Events					
ST 2024	2148606	Dynamic Systems of Technical Logistics - Project	2 SWS	Project (P / 🗣	Mittwollen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation

Prerequisites
T-MACH-112113 (Dynamic Systems of Technical Logistics) must have been started.

Below you will find excerpts from events related to this course:

V Dynamic Systems of Technical Logistics - Project

2148606, SS 2024, 2 SWS, Language: German, Open in study portal

Project (PRO)
On-Site

Content
Conveyor technology = motion = dynamics
Course content:
The knowledge acquired in the lecture DSTL will be extended and deepened together with the previous knowledge from GTL I/II in the context of an independent project work based on an application case from the current research and project work at IFL. Analyses, research, design work, calculations and simulations are used.

Organizational issues
DSTL und DSTL-P sind zeitlich so gegliedert, dass zunächst unter Hinzunahme des Mittwochs-Zeitslots für die Vorlesung ausschließlich der Vorlesungs- und Übungsteil bis ca. Ende Juni gehalten wird. Der anschließende Zeitraum ist ausschließlich für die (optionale) Projektarbeit vorgesehen.

T 7.117 Course: Economics of Innovation [T-WIWI-112822]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation and Growth
M-WIWI-101497 - Agglomeration and Innovation
M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2560236	Economics of Innovation	2 SWS	Lecture / 🗣	Ott
ST 2024	2560237	Exercises of Economics of Innovation	1 SWS	Practice / 🗣	Ott, Mirzoyan
Exams					
WT 23/24	7900077	Economics of Innovation			Ott
ST 2024	7900107	Economics of Innovation			Ott

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Below you will find excerpts from events related to this course:

V **Economics of Innovation** — **Lecture (V) On-Site**
2560236, SS 2024, 2 SWS, Language: English, Open in study portal

Content
Learning objectives:

Students shall be given the ability to

- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- understand the relationships between market structure and the development of innovation
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Course content:

The course covers the following topics:

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Exam description:

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Literature
Auszug:

- Aghion, P., Howitt, P. (2009), The Economics of Growth, MIT Press, Cambridge MA.
- de la Fuente, A. (2000), Mathematical Methods and Models for Economists. Cambridge University Press, Cambridge, UK.
- Klodt, H. (1995), Grundlagen der Forschungs- und Technologiepolitik. Vahlen, München.
- Linde, R. (2000), Allokation, Wettbewerb, Verteilung - Theorie, UNIBUCH Verlag, Lüneburg.
- Ruttan, V. W. (2001), Technology, Growth, and Development. Oxford University Press, Oxford.
- Scotchmer, S. (2004), Incentives and Innovation, MIT Press.
- Tirole, Jean (1988), The Theory of Industrial Organization, MIT Press, Cambridge MA.

T 7.118 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Responsible: Prof. Dr. Patrick Jochem
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2024	2581006	Efficient Energy Systems and Electric Mobility	2 SWS	Lecture / 🗣	Jochem
Exams					
WT 23/24	7981006	Efficient Energy Systems and Electric Mobility			Fichtner
ST 2024	7981006	Efficient Energy Systems and Electric Mobility			Fichtner

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Efficient Energy Systems and Electric Mobility

2581006, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

- Understand the concept of energy efficiency as applied to specific systems
- Obtain an overview of the current trends in energy efficiency
- Be able to determine and evaluate alternative methods of energy efficiency improvement
- Overview of technical and economical stylized facts on electric mobility
- Judging economical, ecological and social impacts through electric mobility

Organizational issues
s. Institutsaushang

Literature
Wird in der Vorlesung bekanntgegeben.

T 7.119 Course: eFinance: Information Systems for Securities Trading [T-WIWI-110797]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture / 🗣	Weinhardt, Jaquart
WT 23/24	2540455	Übungen zu eFinance: Information Systems for Securities Trading	1 SWS	Practice / 🗣	Motz
Exams					
WT 23/24	7900182	eFinance: Information Engineering and Management for Securities Trading			Weinhardt
ST 2024	7900269	eFinance: Information Systems for Securities Trading			Weinhardt

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is monitored by means of ongoing elaborations and presentations of tasks and an examination (60 minutes) at the end of the lecture period. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102600 - eFinance: Information Engineering and Management for Securities Trading must not have been started.

Annotation
The course"eFinance: Information Systems for Securities Trading" covers different actors and their function in the securities industry in-depth, highlighting key trends in modern financial markets, such as Distributed Ledger Technology, Sustainable Finance, and Artificial Intelligence. Security prices evolve through a large number of bilateral trades, performed by market participants that have specific, well-regulated and institutionalized roles. Market microstructure is the subfield of financial economics that studies the price formation process. This process is significantly impacted by regulation and driven by technological innovation. Using the lens of theoretical economic models, this course reviews insights concerning the strategic trading behaviour of individual market participants, and models are brought market data. Analytical tools and empirical methods of market microstructure help to understand many puzzling phenomena in securities markets.

Below you will find excerpts from events related to this course:

V eFinance: Information Systems for Securities Trading

2540454, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature

- Picot, Arnold, Christine Bortenlänger, Heiner Röhrl (1996): "Börsen im Wandel". Knapp, Frankfurt
- Harris, Larry (2003): "Trading and Exchanges - Market Microstructure for Practitioners"". Oxford University Press, New York

Weiterführende Literatur:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

T 7.120 Course: Electronics and EMC [T-ETIT-100723]

Responsible: Dr. Martin Sack
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101163 - High-Voltage Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2307378	Electronics and EMC	2 SWS	Lecture / 🗣	Sack
Exams					
WT 23/24	7307378	Electronics and EMC			Sack
ST 2024	7307378	Electronics and EMC			Sack

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.121 Course: Emerging Trends in Digital Health [T-WIWI-110144]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2513404	Seminar Emerging Trends in Digital Health (Bachelor)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak
ST 2024	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 7.122 Course: Emerging Trends in Internet Technologies [T-WIWI-110143]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2513402	Seminar Emerging Trends in Internet Technologies (Bachelor)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak
ST 2024	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 7.123 Course: Emissions into the Environment [T-WIWI-102634]

Responsible: Ute Karl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2581962	Emissions into the Environment	2 SWS	Lecture / 🗣	Karl
Exams					
WT 23/24	7981962	Emissions into the Environment			Schultmann
ST 2024	7981962	Emissions into the Environment			Schultmann

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Recommendation
None

Below you will find excerpts from events related to this course:

V Emissions into the Environment

2581962, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Emission sources/emission monitoring/emission reduction: The lecture gives an overview of relevant emissions of air pollutants and greenhouse gases, emission monitoring and pollutant abatement options together with relevant legal regulations at national and international level. In addition, the fundamentals of circular economy, waste management and recycling are explained.

Structure:

Air pollution control

- Introduction, terms and definitions
- Sources of air pollutants
- Legal framework of air quality control
- Technical measures to reduce air pollutant emissions

Circular economy, recycling and waste management

- Waste collection and logistics
- Dual systems for packaging waste
- Recycling
- Thermal and biological waste treatment
- Final waste disposal

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.124 Course: Employment Law [T-INFO-111436]

Responsible: Dr. Alexander Hoff
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	24668	Employment Law	2 SWS	Lecture / 🗣	Hoff
Exams					
WT 23/24	7500001	Employment Law			Sattler, Matz
ST 2024	7500082	Employment Law			Sattler

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.125 Course: Energetic Refurbishment [T-BGU-111211]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Dr.-Ing. Harald Schneider

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction
M-BGU-105592 - Digitalization in Facility Management
M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	1,5	Grade to a third	Each term	1 terms	1

Events					
WT 23/24	6240903	Energetische Sanierung	1 SWS	Lecture / 🗣	Kropp, Münzl, Schneider
Exams					
WT 23/24	8240111211	Energetic Refurbishment			Lennerts, Schneider

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.126 Course: Energy and Environment [T-WIWI-102650]

Responsible: Ute Karl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology
M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	2

Events					
ST 2024	2581003	Energy and Environment	2 SWS	Lecture / 🗣	Karl
Exams					
WT 23/24	7981003	Energy and Environment			Fichtner
ST 2024	7900294	Energy and Environment NEW			Karl
ST 2024	7981003	Energy and Environment			Karl

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy and Environment

2581003, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture focuses on the environmental impacts arising from fossil fuels use and on the methods for the evaluation of such impacts. The first part of the lecture describes the environmental impacts of air pollutants and greenhouse gases as well as technical measures for emission control. The second part covers methods of impact assessment and their use in environmental communication as well as methods for the scientific support of emission control strategies.

The topics include:

- Fundamentals of energy conversion
- Formation of air pollutants during combustion
- Technical measures to control emissions from fossil-fuel combustion processes
- External effects of energy supply (life cycle analyses of selected energy systems)
- Environmental communication on energy services (e.g. electricity labelling, carbon footprint)
- Integrated Assessment Modelling to support the European Clean Air Strategy
- Cost-effectiveness analyses and cost-benefit analyses for emission control strategies
- Monetary valuation of external effects (external costs)

Literature
Die Literaturhinweise sind in den Vorlesungsunterlagen enthalten (vgl. ILIAS)

T 7.127 Course: Energy and Process Technology I [T-MACH-102211]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Prof. Dr. Ulrich Maas
Dr.-Ing. Corina Schwitzke
Dr. Amin Velji

Organisation: KIT Department of Mechanical Engineering

Institute of Thermal Turbomachinery

Part of: M-MACH-101296 - Energy and Process Technology I

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	1

Events					
WT 23/24	2157961	Energy and Process Technology I	6 SWS	Lecture / Practice (/ 🗣	Bauer, Mitarbeiter, Wagner, Maas, Schwitzke, Wirbser, Reichel
Exams					
WT 23/24	76-T-MACH-102211	Energy and Process Technology I			Bauer, Wirbser, Schwitzke, Wagner
ST 2024	76-T-MACH-102211	Energy and Process Technology I			Bauer, Wirbser, Schwitzke, Pritz, Wagner

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
none

Below you will find excerpts from events related to this course:

V Energy and Process Technology I

2157961, WS 23/24, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The last thrid of the lecture deals with the topic **Thermal Turbomachinery**. The basic principles, the functionality and the scope of application of gas and steam tubrines for the generation of electrical power and propulsion technology are addressed.

The students are able to:

- describe and calculate the basic physical-technical processes
- apply the mathematical and thermodynamical description
- reflect on and explain the diagrams and schematics
- comment on diagrams
- explain the functionality of gas and steam turbines and their components
- name the applications of thermal turbomachinery and their role in the field of electricity generation and propulsion technology

T 7.128 Course: Energy and Process Technology II [T-MACH-102212]

Responsible: Prof. Dr. Ulrich Maas
Dr.-Ing. Corina Schwitzke

Organisation: KIT Department of Mechanical Engineering

Institute of Thermal Turbomachinery

Part of: M-MACH-101297 - Energy and Process Technology II

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2024	2170832	Energy and Process Technology II	6 SWS	Lecture / Practice (/ 🗣	Schwitzke, Pritz, Maas, Wirbser, Schmid
Exams					
WT 23/24	76-T-MACH-102212	Energy and Process Technology II			Schwitzke, Wirbser, Bauer, Wagner
ST 2024	76-T-MACH-102212	Energy and Process Technology II			Wirbser, Schwitzke, Bauer, Pritz, Wagner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
none

Below you will find excerpts from events related to this course:

V Energy and Process Technology II

2170832, SS 2024, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Thermal Turbomaschinery - In the first part of the lecture deals with energy systems. Questions regarding global energy resources and their use, especially for the generation and provision of electrical energy, are addressed. Common fossile and nuclear power plants for the centralized supply with electrical power as well as concepts of power-heat cogeneration for the decentralized electrical power supply by means of block-unit heat and power plants, etc. are discussed. Moreover, the characteristics and the potential of renewable energy conversion concepts, such as wind and hydro-power, photovoltaics, solar heat, geothermal energy and fuel cells are compare and evaluated. The focus is on the description of the potentials, the risks and the economic feasibility of the different strategies aimed to protect resources and reduce CO2 emissions.

The students are able to:

- discuss and evaluate energy resources and reserves and their utility
- review the use of energy carriers for electrical power generation
- explain the concepts and properties of power-heat cogeneration, renewable energy conversion and fuel cells and their fields of application
- comment on and compare centralized and decentralized supply concepts
- calculate the potentials, riskis and economic feasibility of different strategies aiming at the protection of resources and the reduction of CO2 emissions
- name and judge on the options for solar energy utilization
- discuss the potential of geothermal energy and its utilization

T 7.129 Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

Responsible: Dr.-Ing. Meike Kramer
Dr. Frank Schönung

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2117500	Energy efficient intralogistic systems	2 SWS	Lecture / 🗣	Kramer, Schönung
Exams					
WT 23/24	76-T-MACH-105151	Energy Efficient Intralogistic Systems			Kramer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral, 30 min. examination dates after the end of each lesson period.

Prerequisites
none

Recommendation
The content of course “Basics of Technical Logistics I” (T-MACH-109919) should be known.

Annotation
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.

Below you will find excerpts from events related to this course:

V Energy efficient intralogistic systems

2117500, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The content of course “Basics of Technical Logistics” should be knownn.

Organizational issues
Blockveranstaltung 2022/2023. Die Veranstaltung findet in Präsenz statt

Literature
Keine.

T 7.130 Course: Energy Market Engineering [T-WIWI-107501]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101411 - Information Engineering
M-WIWI-101446 - Market Engineering
M-WIWI-101451 - Energy Economics and Energy Markets
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2540464	Energy Market Engineering	2 SWS	Lecture / 🗣	Weinhardt, Miskiw
ST 2024	2540465	Übung zu Energy Market Engineering	1 SWS	Practice / 🗣	Semmelmann
Exams					
WT 23/24	7900127	Energy Market Engineering			Weinhardt

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".

The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

Below you will find excerpts from events related to this course:

V Energy Market Engineering

2540464, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Vorlesungsstart: 25.04.24

Literature

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.
- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

T 7.131 Course: Energy Networks and Regulation [T-WIWI-107503]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2540494	Energy Networks and Regulation	2 SWS	Lecture / 🗣	Rogat, Miskiw
WT 23/24	2540495	Übung zu Energy Networks and Regulation	1 SWS	Practice / 🗣	Rogat, Miskiw
Exams					
WT 23/24	7900198	Energy Networks and Regulation			Weinhardt
ST 2024	7900272	Energy Networks and Regulation			Weinhardt

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation.

The exam is offered every semester. Re-examinations are offered on every ordinary examination date.

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

Below you will find excerpts from events related to this course:

V Energy Networks and Regulation

2540494, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Learning Goals

The student,

- understands the business model of a network operator and knows its central tasks in the energy supply system,
- has a holistic overview of the interrelationships in the network economy,
- understands the regulatory and business interactions,
- is in particular familiar with the current model of incentive regulation with its essential components and understands its implications for the decisions of a network operator
- is able to analyse and assess controversial issues from the perspective of different stakeholders.

Content of teaching

The lecture “Energy Networks and Regulation” provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead (“Energiewende”, redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO
- Objectives of regulation: Fair price calculation and high standard access conditions
- The functioning of incentive regulation
- First major amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily?) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Literature

Averch, H.; Johnson, L.L (1962). Behavior of the firm under regulatory constraint, in: American Economic Review, 52 (5), S. 1052 – 1069.

Bundesnetzagentur (2006): Bericht der Bundesnetzagentur nach § 112a EnWG zur Einführung der Anreizregulierung nach § 21a EnWG, http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/Netzentgelte/Anreizregulierung/BerichtEinfuehrgAnreizregulierung.pdf?__blob=publicationFile&v=3.

Bundesnetzagentur (2015): Evaluierungsbericht nach § 33 Anreizregulierungsverordnung, https://www.bmwi.de/Redaktion/DE/Downloads/A/anreizregulierungsverordnung-evaluierungsbericht.pdf?__blob=publicationFile&v=1.

Filippini, M.; Wild, J.; Luchsinger, C. (2001) : Regulierung der Verteilnetzpreise zu Beginn der Marktöffnung. Erfahrungen in Norwegen und Schweden, Bundesamt für Energie, Bern, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/34/066/34066585.pdf.

Gómez, T. (2013): Monopoly Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 151 – 198, Springer-Verlag, London.

Gómez, T. (2013): Electricity Distribution, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 199 – 250, Springer-Verlag, London.

Pérez-Arriaga, I.J. (2013): Challenges in Power Sector Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 647 – 678, Springer-Verlag, London.

Rivier, M.; Pérez-Arriaga, I.J.; Olmos, L. (2013): Electricity Transmission, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 251 – 340, Springer-Verlag, London.

T 7.132 Course: Energy Trading and Risk Management [T-WIWI-112151]

Responsible: N.N.
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	2

Events					
ST 2024	2581020	Energy Trading and Risk Management	2 SWS	Lecture / 🗣	Kraft, Fichtner, Beranek
Exams					
WT 23/24	7981020	Energy Trading and Risk Management			Fichtner
ST 2024	7981020	Energy Trade and Risk Management			Fichtner

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The lecture "Energiehandel und Risikomanagement" will be held in English under the title "Energy Trading and Risk Management" from the summer semester 2022. The examination for the English-language lecture will be offered in English from the summer semester 2022.
The assessment consists of a written exam (60 minutes). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Energy Trading and Risk Management

2581020, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction to Markets, Mechanisms and Interaction
2. Electricity Trading (platforms, products, mechanisms)
3. Balancing Energy Markets and Congestion Management
4. Coal Markets (reserves, supply, demand, and transport)
5. Investments and Capacity Markets
6. Oil and Gas Markets (supply, demand, trade, and players)
7. Trading Game
8. Risk Management in Energy Trading

Literature
Weiterführende Literatur:

Burger, M., Graeber, B., Schindlmayr, G. (2007): *Managing energy risk: An integrated view on power and other energy markets*, Wiley&Sons, Chichester, England

EEX (2010): *Einführung in den Börsenhandel an der EEX auf Xetra und Eurex*, www.eex.de

Erdmann, G., Zweifel, P. (2008), Energieökonomik, Theorie und Anwendungen, Springer, ISBN: 978-3-540-71698-3

Hull, J.C. (2006): *Options, Futures and other Derivatives*, 6. Edition, Pearson Prentice Hall, New Jersey, USA

Borchert, J., Schlemm, R., Korth, S. (2006): *Stromhandel: Institutionen, Marktmodelle, Pricing und Risikomanagement (Gebundene Ausgabe)*, Schäffer-Poeschel Verlag

www.riskglossary.com

T 7.133 Course: Engine Measurement Techniques [T-MACH-105169]

Responsible: Dr.-Ing. Sören Bernhardt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2134137	Engine measurement techniques	2 SWS	Lecture / 🗣	Bernhardt
Exams					
WT 23/24	76-T-MACH-105169	Engine Measurement Techniques			Koch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: 0,5 hours, no auxiliary means

Prerequisites
none

Recommendation
T-MACH-102194 Combustion Engines I

Below you will find excerpts from events related to this course:

V Engine measurement techniques

2134137, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

1. Grohe, H.:Messen an Verbrennungsmotoren
2. Bosch: Handbuch Kraftfahrzeugtechnik
3. Veröffentlichungen von Firmen aus der Meßtechnik
4. Hoffmann, Handbuch der Meßtechnik
5. Klingenberg, Automobil-Meßtechnik, Band C

T 7.134 Course: Engineering Hydrology [T-BGU-108943]

Responsible: PD Dr.-Ing. Uwe Ehret
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	6200617	Engineering Hydrology	2 SWS	Lecture / Practice (/	Ehret
Exams					
WT 23/24	8230108943	Engineering Hydrology			Ehret

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.135 Course: Engineering Interactive Systems: AI & Wearables [T-WIWI-113460]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The course is held in English.

T 7.136 Course: Entrepreneurship [T-WIWI-102864]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 23/24	2545001	Entrepreneurship	2 SWS	Lecture /	Terzidis
ST 2024	2545001	Entrepreneurship	2 SWS	Lecture /	Terzidis, Dang
Exams					
WT 23/24	7900045	Entrepreneurship			Terzidis
WT 23/24	7900229	Entrepreneurship			Terzidis

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Students are offered the opportunity to earn a grade bonus through separate assignments. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the lecture.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Entrepreneurship

2545001, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The lecture as an obligatory part of the module "Entrepreneurship" introduces the basic concepts of entrepreneurship. Important concepts and empirical facts are presented that relate to the conception and implementation of newly founded companies.

The focus here is on the introduction to methods for generating innovative business ideas, for transferring patents into business concepts and general principles of business modelling and business planning. In particular approaches such as Lean Startup and Effectuation as well as concepts for the financing of young enterprises are treated.

A "KIT Entrepreneurship Talk" is part of each session, in which experienced founder and entrepreneur personalities report on their experiences in practice of the establishment of an enterprise. Dates and speakers will be announced on the EnTechnon homepage.

Learning objectives:

The studentsare introduced to the topic Entrepreneurship. After successful attendance of the meeting they are to have an overview of the subranges of the Entrepreneurships and be able to understand basic concepts of the Entrepreneurships and apply key concepts.

Workload:

Total effort with 3 credit points: approx. 90 hours
Presence time: 30 hours
Pre- and postprocessing of the LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Examination:

The assessment of success takes place in the form of a written examination (60 min.) (according to §4(2), 1 SPO). The grade is the grade of the written exam.

A grade bonus can be earned through successful participation in a case study in the Entrepreneurship lecture. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to 0.3 or 0.4.The bonus only applies if you have passed the exam with at least a 4.0. More details will be provided in the lecture. Participation in the case study is voluntary.

Exam date: tba

Organizational issues
VL findet jeweils Mo, 15:45 - 19:00 an folgenden Terminen statt:
23.10.2023
30.10.2023
06.11.2023
13.11.2023
20.11.2023
27.11.2023
04.12.2023
11.12.2023 (Prep Session)

Literature
Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

R.C. Dorf, T.H. Byers: Technology Ventures – From Idea to Enterprise., (McGraw Hill 2008)

Füglistaller, Urs, Müller, Christoph and Volery, Thierry (2008): Entrepreneurship

Hisrich, Robert D.; Ramadani, Veland (2017): Effective entrepreneurial management. Strategy, planning, risk management, and organization. Cham, Switzerland: Springer.

Ries, Eric (2011): The Lean Startup.

Osterwalder, Alexander (2010): Business Model Generation.

V **Entrepreneurship** — **Lecture (V)**
2545001, SS 2024, 2 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
The lecture as a compulsory part of the module "Entrepreneurship" introduces the basic concepts of entrepreneurship. Important concepts and empirical facts are introduced, which relate to the conception and implementation of newly founded companies.

The focus here is on introducing methods for generating innovative business ideas, translating patents into business concepts, and general principles of business modeling and business planning. In particular, approaches such as Lean-Startup and Effectuation as well as concepts for financing young companies are covered.

A "KIT Entrepreneurship Talk" is part of each session, in which experienced founder and entrepreneur personalities report on their experiences in the practice of the establishment of an enterprise. Dates and speakers will be announced on the EnTechnon homepage.

Learning objectives:

The students will be introduced to the topic of entrepreneurship. After successful attendance of the course they should have an overview of the sub-areas of entrepreneurship and be able to understand basic concepts of entrepreneurship and apply key concepts.

Workload:

The total effort with 3 credit points: approx. 90 hours
Presence time: 30 hours
Pre- and postprocessing of the LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Examination:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation)

A grade bonus can be earned by successfully participating in a case study as part of the Entrepreneurship lecture. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to 0.3 or 0.4. The bonus only applies if you have passed the exam with at least a 4.0. More details will be provided in the lecture. Participation in the case study is voluntary.

Exam dates: tbd

Organizational issues
VL findet jeweils Di, 15:45 - 19:00 an folgenden Terminen statt:

16.04.2024
23.04.2024
30.04.2024
07.05.2024
14.05.2024
28.05.2024
04.06.2024
11.06.2024 (Prep Session)

18.06.2024 (Klausur)

Literature
Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship

Ries, Eric (2011): The Lean Startup

Osterwalder, Alexander (2010): Business Model Generation

Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

R.C. Dorf, T.H. Byers: Technology Ventures – From Idea to Enterprise., (McGraw Hill 2008)

Hisrich, Robert D.; Ramadani, Veland (2017): Effective entrepreneurial management. Strategy, planning, risk management, and organization. Cham, Switzerland: Springer.

T 7.137 Course: Entrepreneurship Research [T-WIWI-102894]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2024	2545002	Entrepreneurship Research	2 SWS	Seminar / 🗣	Terzidis, Tittel, Rosales Bravo
Exams					
ST 2024	7900052	Entrepreneurship Research			Terzidis

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The performance review is done via a so called other methods of performance review (term paper) (alternative exam assessment). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

Prerequisites
None

Recommendation
None

Annotation
The topics will be prepared in groups. The presentation of the results is done during a a block period seminar at the end of the semester. Students have to be present all day long during the seminar.

Below you will find excerpts from events related to this course:

V Entrepreneurship Research

2545002, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Content

In this course, the students choose from various relevant and current research topics in entrepreneurship and independently develop a topic that suits them in small teams. Initially, there is an introduction to standard methods such as systematic literature review, design science, qualitative and quantitative data analysis, and more. The seminar topic must be scientifically prepared and presented in 15-20 pages as part of a written elaboration. The seminar results are presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

The foundations of independent scholarly work (literature review, argumentation + discussion, citation of literature sources, application of qualitative, quantitative, and simulation methods) are developed as part of the written elaboration. The competencies acquired in the seminar can be utilized in preparing for a potential master's thesis. Therefore, the seminar is mainly aimed at students who intend to write their thesis at the Chair of Entrepreneurship and Technology Management and wish to gain substantial experience in entrepreneurship research.

Organizational issues
Monday, 17.06.2024, 10.00-17.00
Thursday, 27.06.2024, 10.00-17.00
Thursday, 25.07.2024, 10.00-17.00

Registration is via the Wiwi-Portal.

Literature
Will be announced in the seminar.

T 7.138 Course: Entrepreneurship Seasonal School [T-WIWI-113151]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 23/24	2500215	Entrepreneurship Seasonal School	2 SWS	Block / 🗣	Weimar, Terzidis
Exams					
WT 23/24	7900146	Entrepreneurship Seasonal School			Terzidis

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment. The grade is composed of the presentation and the written elaboration. Details on the design of the examination will be announced in the course.

Prerequisites
The Seasonal School is intended for advanced bachelor's and all master's students (all disciplines). Participation in the selection process is a prerequisite.

Recommendation
Basic knowledge of business administration, attendance of the lecture Entrepreneurship as well as openness and interest in intercultural exchange are recommended. Solid knowledge of the English language is an advantage.

Annotation
Entrepreneurship Seasonal School

Below you will find excerpts from events related to this course:

V **Entrepreneurship Seasonal School** — **Block (B) On-Site**
2500215, WS 23/24, 2 SWS, Language: English, Open in study portal

Content
During the Entrepreneurship Seasonal School, students develop a business model based on innovative technologies and social problems in workshops in international teams for one week.

Course Content:

The Entrepreneurship Seasonal School brings together students from different universities to spend a week strengthening their knowledge of digital entrepreneurship in healthcare. Experience the life of an entrepreneur and learn how to attain resources to realize a product vision. During one week, you will develop a range of entrepreneurial competences crucial for establishing a successful venture. Our primary focus is on digital healthcare ventures, granting you the opportunity to delve into the realm of entrepreneurship within the healthcare system. By gaining a deep understanding of healthcare needs, you will utilize creativity techniques to uncover potential business ideas that provide value for patients and doctors. Additionally, you will learn how to create viable business models, dive into health regulations, and pitch your idea to a jury.

In WS 2023/24 the one-week program is being hosted by the Karlsruhe Institute of Technology, with co-teaching support from the Eucor partners University of Basel and the University of Strasbourg.

In the seminar you will work on a project in teams of max. 5 persons.

Learning Objectives:

After attending the event, you will be able to...

- describe the role of entrepreneurship
- develop innovative and technology-based solutions for societal problems,
- develop a viable business model for a problem,
- present a business idea to a panel of judges,
- and be empowered to work independently in multidisciplinary and multicultural teams

Organizational issues
19.02.24 – 23.02.24, Details will be announced later. Registration via wiwi portal.

T 7.139 Course: Environmental and Resource Policy [T-WIWI-102616]

Responsible: Rainer Walz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2560548	Environmental and Ressource Policy	2 SWS	Lecture / Practice (	Walz
Exams					
WT 23/24	7900252	Environmental and Resource Policy			Walz

Competence Certificate
See German version

Recommendation
It is recommended to already have knowledge in the area of industrial organization and economic policy. This knowledge may be acquired in the courses*Introduction to Industrial Organization* [2520371] and*Economic Policy*[2560280].

Below you will find excerpts from events related to this course:

V Environmental and Ressource Policy

2560548, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Literature
Weiterführende Literatur:

Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg
OECD: Environmental Performance Review Germany, Paris

T 7.140 Course: Environmental Communication [T-BGU-101676]

Responsible: Dr. rer. nat. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
WT 23/24	6224905	Umweltkommunikation / Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
ST 2024	6224905	Environmental Communication	2 SWS	Seminar / 🧩	Kämpf
Exams					
WT 23/24	8244101676	Environmental Communication			Kämpf

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Non exam assessment (following §4(2), 3 of the examination regulation).

Prerequisites
Examination Prerequisite Environmental Communication must be passend.

Recommendation
None

Annotation
none

T 7.141 Course: Environmental Economics and Sustainability [T-WIWI-102615]

Responsible: Prof. Dr. Rainer Walz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 23/24	2521547	Umweltökonomik und Nachhaltigkeit (mit Übung)	2 SWS	Lecture / Practice (	Walz
Exams					
WT 23/24	7900250	Environmental Economics and Sustainability			Walz

Competence Certificate
See German version

Prerequisites
None

Recommendation
It is recommended to already have knowledge in the area of macro- and microeconomics. This knowledge may be acquired in the courses *Economics I: Microeconomics* [2600012] and *Economics II: Macroeconomics* [2600014].

T 7.142 Course: Environmental Law [T-BGU-111102]

Responsible: Dr. Urich Smeddinck
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-101468 - Environmental Economics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	6111177	Environmental Law		Lecture / 🗣	Smeddinck
Exams					
WT 23/24	8262111102_1	Environmental Law			Smeddinck
ST 2024	8262111102_2	Environmental Law			Smeddinck

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam with 120 min

Prerequisites
None

Annotation
None

T 7.143 Course: European and International Law [T-INFO-101312]

Responsible: Ulf Brühann
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	24666	Europäisches und Internationales Recht	2 SWS	Lecture / 🗣	Brühann
Exams					
WT 23/24	7500048	European and International Law			Zufall
ST 2024	7500084	European and International Law			Zufall

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.144 Course: Examination Prerequisite Environmental Communication [T-BGU-106620]

Responsible: Dr. rer. nat. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Events					
WT 23/24	6224905	Umweltkommunikation / Environmental Communication	2 SWS	Seminar / 🗣	Kämpf
ST 2024	6224905	Environmental Communication	2 SWS	Seminar / 🧩	Kämpf
Exams					
WT 23/24	8244106620	Examination Prerequisite Environmental Communication			Kämpf
ST 2024	8244106620	Examination Prerequisite Environmental Communication			Kämpf

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
2 literature annotations, appr. 150 words each, and
short presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.145 Course: Excursions: Membrane Technologies [T-CIWVT-110864]

Responsible: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	1

Events					
ST 2024	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice /	Horn, Saravia, und Mitarbeiter
Exams					
ST 2024	7233011	Excercises for Membrane Technologies			Horn, Saravia

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 7.146 Course: Excursions: Water Supply [T-CIWVT-110866]

Responsible: Dr. Gudrun Abbt-Braun
Prof. Dr. Harald Horn

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101121 - Water Chemistry and Water Technology I

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each winter term	1

Exams			
WT 23/24	7232006	Excursions: Water Supply	Abbt-Braun

T 7.147 Course: Exercises in Civil Law [T-INFO-102013]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-101191 - Commercial Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each term	3

Events					
WT 23/24	24011	Commercial and Corporate Law	2 SWS	Lecture / 🗣	Wiele
WT 23/24	24017	Exercises in Civil Law	2 SWS	Lecture / 🗣	Sattler
ST 2024	24504	Advanced Civil Law	2 SWS	Lecture / 🗣	Matz
ST 2024	24506	Exercises in Civil Law	2 SWS	Lecture / 🗣	Sattler, Bosbach
ST 2024	24926	Case Studies in Civil Law	2 SWS	Practice / 🗣	Bosbach, Natsis
Exams					
WT 23/24	7500108	Commercial Law			Sattler
ST 2024	7500093	Wirtschaftsprivatrecht			Sattler

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 7.148 Course: Experimental Economics [T-WIWI-102614]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101505 - Experimental Economics
M-WIWI-103118 - Data Science: Data-Driven User Modeling
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2540489	Experimental Economics	2 SWS	Lecture / 🗣	Knierim
WT 23/24	2540493	Übung zu Experimental Economics	1 SWS	Practice / 🗣	Greif-Winzrieth, Knierim, del Puppo
Exams					
WT 23/24	7900096	Experimental Economics			Weinhardt
ST 2024	7900258	Experimental Economics			Weinhardt

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min).

By successful completion of 70% of the maximum number of points in the exercise(s) a bonus can be obtained.

If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The exact criteria for the award of a bonus will be announced at the beginning of the lecture.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Experimental Economics

2540489, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2. Aufl. 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

T 7.149 Course: Experimental Lab Class in Welding Technology, in Groups [T-MACH-102099]

Responsible: Dr.-Ing. Stefan Dietrich
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each winter term	2

Events					
WT 23/24	2173560	Welding Lab Course, in groupes	3 SWS	Practical course / 🗣	Dietrich, Schulze
Exams					
WT 23/24	76-T-MACH-102099	Experimental Lab Class in Welding Technology, in Groups			Dietrich

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Certificate to be issued after evaluation of the lab class report.

Prerequisites
Certtificate of attendance for Welding technique (The participation in the course Welding Technology I/II is assumed.).

Annotation
The lab takes place at the beginning of the winter semester break once a year. The registration is possible during the lecture period in the secretariat of the Institute of Applied Materials (IAM – WK). The lab is carried out in the Handwerkskammer Karlsruhe.

You need sturdy shoes and long clothes!

Below you will find excerpts from events related to this course:

V Welding Lab Course, in groupes

2173560, WS 23/24, 3 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Content
The lab takes place at the beginning of the winter semester break once a year. The registration is possible during the lecture period in the secretariat of the Institute of Applied Materials (IAM – WK). The lab is carried out in the Handwerkskammer Karlsruhe.

learning objectives: The students are capable to name a survey of current welding processes and their suitability for joining different metals. The students can evaluate the advantages and disadvantages of the individual procedures. The students have weld with different welding processes.

requirements:

You need sturdy shoes and long clothes!

workload:

regular attendance: 31,5 hours
preparation: 8,5 hours
lab report: 80 hours

Organizational issues
Die Lehrveranstaltung "Experimentelles schweißtechnisches Praktikum" findet dieses Jahr wieder in der Woche vom 12. – 16.2.2024 statt. Der Veranstaltungsort ist die

Bildungsakademie Handwerkskammer Karlsruhe
Hertzstr. 177
76187 Karlsruhe

Die Gruppeneinteilung in die beiden Gruppen findet Anfang Februar statt!

- Gruppe 1. Montag 7.30 Uhr bis Mittwoch 12.00 Uhr
- Gruppe 2. Mittwoch 13.00 Uhr bis Freitag 15.00 Uhr

Sollte aufgrund anderer LV oder Prüfungen für Sie nur eine der beiden Gruppen in Frage kommen, melden Sie sich bitte rechtzeitig bis 4.2.24 unter iam-wk-lehre@iam.kit.edu

Bitte bringen Sie festes und geschlossenes Schuhwerk (optimalerweise Arbeitsschuhe) und lange und entbehrliche Hosen sowie Oberteile mit, da wir uns die Hände schmutzig machen und mit flüssigem, umherfliegendem Metall konfrontiert sein werden. Für die Mittagspause können Sie sich selbst versorgen oder auch in der Mensa der Bildungsakademie essen.

Literature
wird im Praktikum ausgegeben

T 7.150 Course: Extraordinary Additional Course in the Module Cross-Functional Management Accounting [T-WIWI-108651]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate
The assessment depends on which extraordinary course becomes part of the module "Cross-Functional Management Accounting".

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Prerequisites
None

Annotation
The pupose of this placeholder is to make it possible zu include an extraordinary course in the module "Cross-Functional Management Accounting". Proposals for specific courses have to be approved in advance by the module coordinator.

T 7.151 Course: Extrusion Technology in Food Processing [T-CIWVT-112174]

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101119 - Specialization in Food Process Engineering
M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2211310	Extrusion Technology in Food Processing	2 SWS	Lecture / 🗣	Emin
Exams					
WT 23/24	7200055	Extrusion Technology in Food Processing			Emin

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is an oral exam lasting about 20 minutes.

Prerequisites
None.

T 7.152 Course: Fabrication Processes in Microsystem Technology [T-MACH-102166]

Responsible: Dr. Klaus Bade
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Events					
WT 23/24	2143882	Fabrication Processes in Microsystem Technology	2 SWS	Lecture /	Bade
ST 2024	2143882	Fabrication Processes in Microsystem Technology	2 SWS	Lecture /	Bade
Exams					
WT 23/24	76-T-MACH-102166	Fabrication Processes in Microsystem Technology			Bade
ST 2024	76-T-MACH-102166	Fabrication Processes in Microsystem Technology			Bade

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Oral examination, 20 minutes

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fabrication Processes in Microsystem Technology

2143882, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature
M. Madou
Fundamentals of Microfabrication
CRC Press, Boca Raton, 1997
W. Menz, J. Mohr, O. Paul
Mikrosystemtechnik für Ingenieure
Dritte Auflage, Wiley-VCH, Weinheim 2005
L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
2nd Edition, ACS, Washington DC, 1994

V Fabrication Processes in Microsystem Technology

2143882, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture offers an advanced understanding of manufacturing processes in microsystem technology. Basic aspects of microtechnological processing will be introduced. With examples from semiconductor microfabrication and microsystem technology the base processing steps for conditioning and finishing, patterning, removal are imparted. Nano-patterning is covered is also included and the micro-nano interface is discussed. By the help of typical processing steps elementary mechanisms, process execution, and equipment are explained. Additionally quality control, process control and environmental topics are included

Literature

M. Madou
Fundamentals of Microfabrication

CRC Press, Boca Raton, 1997

W. Menz, J. Mohr, O. Paul

Mikrosystemtechnik für Ingenieure

Dritte Auflage, Wiley-VCH, Weinheim 2005

L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
2nd Edition, ACS, Washington DC, 1994

T 7.153 Course: Facility and Real Estate Management II [T-BGU-111212]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-105592 - Digitalization in Facility Management
M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	1,5	Grade to a third	Each term	1 terms	1

Events					
WT 23/24	6242909	Facility and Real Estate Management II	1 SWS	Lecture / 🗣	Lennerts
Exams					
WT 23/24	8240111212	Facility and Real Estate Management II			Lennerts, Schmidt-Bäumler

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.154 Course: Facility Management in Hospitals [T-BGU-108004]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	2

Events					
WT 23/24	6242905	Facility Management in Hospitals	4 SWS	Lecture / Practice (/ 🗣	Lennerts, Mitarbeiter/innen
Exams					
WT 23/24	8240108004	Facility Management in Hospitals			Lennerts, Schmidt-Bäumler

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
term paper appr. 10 pages, with final presentation appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.155 Course: Failure of Structural Materials: Deformation and Fracture [T-MACH-102140]

Responsible: Prof. Dr. Peter Gumbsch
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2181711	Failure of structural materials: deformation and fracture	3 SWS	Lecture / Practice (/	Gumbsch, Weygand
Exams					
WT 23/24	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture			Weygand, Gumbsch, Kraft
ST 2024	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture			Weygand, Gumbsch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

Below you will find excerpts from events related to this course:

V Failure of structural materials: deformation and fracture

2181711, WS 23/24, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

1. Introduction
2. linear elasticity
3. classification of stresses
4. Failure due to plasticity
    - tensile test
    - dislocations
    - hardening mechanisms
    - guidelines for dimensioning
5. composite materials
6. fracture mechanics
    - hypotheses for failure
    - linear elasic fracture mechanics
    - crack resitance
    - experimental measurement of fracture toughness
    - defect measurement
    - crack propagation
    - application of fracture mechanics
    - atomistics of fracture

The student

- has the basic understanding of mechanical processes to explain the relationship between externally applied load and materials strength.
- can explain the foundation of linear elastic fracture mechanics and is able to determine if this concept can be applied to a failure by fracture.
- can decribe the main empirical materials models for deformation and fracture and can apply them.
- has the physical understanding to describe and explain phenomena of failure.

preliminary knowlegde in mathematics, mechanics and materials science recommended

regular attendance: 22,5 hours
self-study: 97,5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Organizational issues
Übungstermine werden in der Vorlesung bekannt gegeben!

nach aktuellem Stand Präsenz

Literature

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe

T 7.156 Course: Failure of Structural Materials: Fatigue and Creep [T-MACH-102139]

Responsible: Dr. Patric Gruber
Prof. Dr. Peter Gumbsch

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2181715	Failure of Structural Materials: Fatigue and Creep	2 SWS	Lecture / 🗣	Gruber, Gumbsch
Exams					
WT 23/24	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep			Gruber, Gumbsch
ST 2024	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep			Gruber, Gumbsch

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

Below you will find excerpts from events related to this course:

V Failure of Structural Materials: Fatigue and Creep

2181715, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1 Fatigue
1.1 Introduction
1.2 Lifetime
1.3 Fatigue Mechanisms
1.4 Material Selection
1.5 Notches and Shape Optimization
1.6 Case Studies: ICE-Accidents

2 Creep
2.1 Introduction
2.2 High Temperature Plasticity
2.3 Phänomenological DEsciption of Creep
2.4 Creep Mechanisms
2.5 Alloying Effects

The student

- has the basic understanding of mechanical processes to explain the relationships between externally applied load and materials strength.
- can describe the main empirical materials models for fatigue and creep and can apply them.
- has the physical understanding to describe and explain phenomena of failure.
- can use statistical approaches for reliability predictions.
- can use its acquired skills, to select and develop materials for specific applications.

preliminary knowlegde in mathematics, mechanics and materials science recommended

regular attendance: 22,5 hours
self-study: 97,5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Literature

- Engineering Materials, M. Ashby and D.R. Jones (2nd Edition, Butterworth-Heinemann, Oxford, 1998); sehr lesenswert, relativ einfach aber dennoch umfassend, verständlich
- Mechanical Behavior of Materials, Thomas H. Courtney (2nd Edition, McGraw Hill, Singapur); Klassiker zu den mechanischen Eigenschaften der Werkstoffe, umfangreich, gut
- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe
- Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); Standardwerk über Ermüdung, alle Materialklassen, umfangreich, für Einsteiger und Fortgeschrittene

T 7.157 Course: Financial Analysis [T-WIWI-102900]

Responsible: Dr. Torsten Luedecke
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2530205	Financial Analysis	2 SWS	Lecture / 🗣	Luedecke
ST 2024	2530206	Übungen zu Financial Analysis	2 SWS	Practice / 🗣	Luedecke
Exams					
WT 23/24	7900059	Financial Analysis			Ruckes, Luedecke
ST 2024	7900075	Financial Analysis			Luedecke

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
See German version.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance, accounting, and valuation is required.

Below you will find excerpts from events related to this course:

V Financial Analysis

2530205, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

T 7.158 Course: Financial Econometrics [T-WIWI-103064]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2520022	Financial Econometrics I	2 SWS	Lecture / 🗣	Schienle, Buse
WT 23/24	2520023	Übungen zu Financial Econometrics I	2 SWS	Practice / 🗣	Schienle, Buse
Exams					
WT 23/24	7900123	Financial Econometrics II			Schienle
WT 23/24	7900126	Financial Econometrics			Schienle
ST 2024	7900223	Financial Econometrics			Schienle

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Annotation
The next lecture will take place in the winter semester 2022/23.

Below you will find excerpts from events related to this course:

V Financial Econometrics I

2520022, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Learning objectives:

The student

- shows a broad knowledge of fincancial econometric estimation and testing techniques
- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

Content:

ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

Requirements:

It is recommended to attend the course *Economics III: Introduction to Econometrics* [2520016] prior to this course.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Literature

Taylor, S. J. (2005): "Asset Price Dynamics, Volatility, and Prediction", Princeton University Press.

Tsay, R. S. (2005): "Analysis of Financial Time Series: Financial Econometrics", Wiley, 2nd edition.

Cochrane, J. H. (2005): "Asset Pricing", revised edition, Princeton University Press.

Campbell, J. Y., A. W. Lo, and A. C. MacKinlay (1997): "The Econometrics of Financial Markets", Princeton University Press.

Hamilton, J. D. (1994): "Time Series Analysis", Princeton University Press.

Additional literature will be discussed in the lecture.

T 7.159 Course: Financial Econometrics II [T-WIWI-110939]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2024	2521302	Financial Econometrics II	2 SWS	Lecture / 🗣	Schienle, Buse
ST 2024	2521303	Übung zu Financial Econometrics II	1 SWS	Practice / 🗣	Buse, Schienle
Exams					
ST 2024	7900081	Financial Econometrics II			Schienle

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination (90 minutes). If the number of participants is low, an oral examination will be held instead.

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Financial Econometrics"

Annotation
Course language is English
The next lecture will take place in the summer semester of 2023.

T 7.160 Course: Financial Intermediation [T-WIWI-102623]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2530232	Financial Intermediation	2 SWS	Lecture / 🗣	Ruckes
WT 23/24	2530233	Übung zu Finanzintermediation	1 SWS	Practice	Ruckes, Benz
Exams					
WT 23/24	7900063	Financial Intermediation			Ruckes
ST 2024	7900078	Financial Intermediation			Ruckes

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Financial Intermediation

2530232, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Terminankündigungen des Instituts beachten

Literature
Weiterführende Literatur:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

T 7.161 Course: Fluid Power Systems [T-MACH-102093]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 23/24	2114093	Fluid Technology	2 SWS	Lecture / 🗣	Geimer
Exams					
WT 23/24	76-T-MACH-102093	Fluid Power Systems			Geimer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a writen exam (90 minutes) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fluid Technology

2114093, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In the range of hydrostatics the following topics will be introduced:

- Hydraulic fluids
- Pumps and motors
- Valves
- Accessories
- Hydraulic circuits.

In the range of pneumatics the following topics will be introduced:

- Compressors
- Motors
- Valves
- Pneumatic circuits.

- regular attendance: 21 hours
- self-study: 92 hours

Literature
Skriptum zur Vorlesung *Fluidtechnik*
Institut für Fahrzeugsystemtechnik
downloadbar

T 7.162 Course: Food Chemistry Basics [T-CHEMBIO-109442]

Responsible: Prof. Dr. Mirko Bunzel
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	6601	Grundlagen der Lebensmittelchemie I	2 SWS	Lecture / 🗣	Bunzel
Exams					
WT 23/24	71109442	Food Chemistry Basics			Bunzel
ST 2024	71109442	Food Chemistry Basics			Bunzel

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 7.163 Course: Food Science and Functionality [T-CIWVT-111535]

Responsible: Prof. Dr. Bernhard Watzl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2211810	Lebensmittelkunde und -funktionalität	2 SWS	Lecture / ✕	N.N.
Exams					
WT 23/24	7220019	Food Science and Functionality			Watzl

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
The examination is an oral examination with a duration of about 30 minutes (section 4 subsection 2 number 2 SPO).

Prerequisites
None

T 7.164 Course: Food Science and Functionality [T-CIWVT-108801]

Responsible: Prof. Dr. Bernhard Watzl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2211810	Lebensmittelkunde und -funktionalität	2 SWS	Lecture / ✕	N.N.
Exams					
WT 23/24	7220019	Food Science and Functionality			Watzl
ST 2024	7220019	Food Science and Functionality			Watzl

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
The examination is an oral examination with a duration of about 30 minutes (section 4 subsection 2 number 2 SPO).

Prerequisites
None

T 7.165 Course: Foundry Technology [T-MACH-105157]

Responsible: Dr.-Ing. Christian Wilhelm
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2024	2174575	Foundry Technology	2 SWS	Lecture / 🗣	Schulze, Dietrich

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam; about 25 minutes

Prerequisites
None

Recommendation
It is strongly recommended to pass the two courses "Materials Science I" (T-MACH-102078) and "Materials Science II" (T-MACH-102079).

Below you will find excerpts from events related to this course:

V Foundry Technology

2174575, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
Literaturhinweise werden in der Vorlesung gegeben

Reference to literature, documentation and partial lecture notes given in lecture

T 7.166 Course: Freight Transport [T-BGU-106611]

Responsible: Dr.-Ing. Bastian Chlond
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	2

Events					
ST 2024	6232809	Freight Transport	2 SWS	Lecture / Practice (/ 🗣	Szimba
Exams					
WT 23/24	8245106611	Freight Transport			Chlond

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.167 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Responsible: Hon.-Prof. Dr. Bernhard Ulrich Kehrwald
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2133108	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture / 🗣	Kehrwald
Exams					
WT 23/24	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines			Kehrwald

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: ca. 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fuels and Lubricants for Combustion Engines

2133108, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
electric drives and fuel cell drives with the associated operating materials will also be presented

- Introduction, basics, primary energy and energy chains
- Illustrative chemistry of hydrocarbons
- Fossil fuels, exploration, processing, standards
- Operating materials not fossil, renewable, alternative
- Fuels, lubricants, coolants, AdBlue
- Laboratory analysis, testing, test benches and measurement technology
- Excursion to test fields for motorized drives from 0.5 to 3,500 kW

Literature
Skript

T 7.168 Course: Functional Ceramics [T-MACH-105179]

Responsible: Dr. Manuel Hinterstein
Dr.-Ing. Wolfgang Rheinheimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2126784	Functional Ceramics	2 SWS	Lecture /	Hinterstein
Exams					
WT 23/24	7600054	Functional Ceramics			Hinterstein
ST 2024	76-T-MACH-105179	Functional Ceramics			Hinterstein

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min) taking place at the agreed date.

Auxiliary means: none

The re-examination is offered upon agreement.

Prerequisites
none

T 7.169 Course: Fundamentals for Design of Motor-Vehicle Bodies I [T-MACH-102116]

Responsible: Dipl.-Ing. Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2113814	Fundamentals for Design of Motor-Vehicles Bodies I	1 SWS	Lecture / 🗣	Bardehle
Exams					
WT 23/24	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I			Unrau, Bardehle
ST 2024	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I			Bardehle, Unrau

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fundamentals for Design of Motor-Vehicles Bodies I

2113814, WS 23/24, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. History and design

2. Aerodynamics

3. Design methods (CAD/CAM, FEM)

4. Manufacturing methods of body parts

5. Fastening technologie

6. Body in white / body production, body surface

Learning Objectives:

The students have an overview of the fundamental possibilities for design and manufacture of motor-vehicle bodies. They know the complete process, from the first idea, through the concept to the dimensioned drawings (e.g. with FE-methods). They have knowledge about the fundamentals and their correlations, to be able to analyze and to judge relating components as well as to develop them accordingly.

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Termine und nähere Informationen: siehe ILIAS oder Institutshomepage

Dates and further information will be published on the homepage of the institute

Literature

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T 7.170 Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

Responsible: Dipl.-Ing. Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each summer term	1

Events					
ST 2024	2114840	Fundamentals for Design of Motor-Vehicles Bodies II	1 SWS	Lecture / 🗣	Bardehle
Exams					
WT 23/24	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II			Bardehle
ST 2024	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II			Bardehle, Gauterin

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fundamentals for Design of Motor-Vehicles Bodies II

2114840, SS 2024, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Body properties/testing procedures
2. External body-parts
3. Interior trim
4. Compartment air conditioning
5. Electric and electronic features
6. Crash tests
7. Project management aspects, future prospects

Learning Objectives:

The students know that, often the design of seemingly simple detail components can result in the solution of complex problems. They have knowledge in testing procedures of body properties. They have an overview of body parts such as bumpers, window lift mechanism and seats. They understand, as well as, parallel to the normal electrical system, about the electronic side of a motor vehicle. Based on this they are ready to analyze and to judge the relation of these single components. They are also able to contribute competently to complex development tasks by imparted knowledge in project management.

Organizational issues
Voraussichtliche Termine, nähere Informationen und evtl. Änderungen:

siehe Institutshomepage.

Scheduled dates, further Information and possible changes of date:

see homepage of the institute.

Literature

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T 7.171 Course: Fundamentals for Financial -Quant and -Machine Learning Research [T-WIWI-111846]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105894 - Foundations for Advanced Financial -Quant and -Machine Learning Research

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	see Annotations	1

Competence Certificate
Due to the professor's research sabbatical, the BSc module "Financial Data Science" and MSc module "Foundations for Advanced Financial -Quant and -Machine Learning Research" and the MSc module "Advanced Machine Learning and Data Science" along with the respective examinations will not be offered in SS2023. Bachelor and Master thesis projects are not affected and will be supervised.

The module examination is an alternative exam assessment with a maximum score of 100 points to be achieved. These points are distributed over 4 worksheets to be submitted during the semester. The worksheets cover the respective material of the module and are handed out, worked on and assessed in lecture weeks 3 (10 points), 6 (20 points), 9 (30 points) and 12 (40 points).

The module-wide exam (all 4 worksheets) must be taken in the same semester.

The worksheets are a mixture of analytical tasks and programming tasks with financial data.

Recommendation

- Strongly recommended to have good knowledge in financial econometrics (MLE, OLS, GLS, ARMA-GARCH), mathematics (differential equations, difference equations and optimization), investments (CAPM, factor models), asset pricing (SDF, SDF pricing), derivatives (Black-Scholes, risk-neutral pricing), and programming of statistical concepts (Java or R or Python or Matlab or C or ...)
- Strongly recommended to have a strong interest for interdisciplinary research work in statistics, programming, applied math and financial economics.
- Students lacking the prior knowledge might find the resources of the Chair helpful: www.youtube.com/c/cram-kit.

Annotation
The course is offered every second year.

T 7.172 Course: Fundamentals in the Development of Commercial Vehicles [T-MACH-111389]

Responsible: Christof Weber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	3	Grade to a third	see Annotations	2 terms	2

Events					
WT 23/24	2113812	Fundamentals in the Development of Commercial Vehicles I	1 SWS	Lecture / 🗣	Weber
ST 2024	2114844	Fundamentals in the Development of Commercial Vehicles II	1 SWS	Lecture / 🗣	Weber
Exams					
WT 23/24	76T-MACH-111389	Fundamentals in the Development of Commercial Vehicles			Weber
ST 2024	76T-MACH-111389	Fundamentals in the Development of Commercial Vehicles			Weber

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral group examination

Duration: appr. 30 minutes

Auxiliary means: none

Prerequisites
none

Annotation
Fundamentals in the Development of Commercial Vehicles I, WT

Fundamentals in the Development of Commercial Vehicles II, ST

Below you will find excerpts from events related to this course:

V Fundamentals in the Development of Commercial Vehicles I

2113812, WS 23/24, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Introduction, definitions, history
2. Development tools
3. Complete vehicle
4. Cab, bodyshell work
5. Cab, interior fitting
6. Alternative drive systems
7. Drive train
8. Drive system diesel engine
9. Intercooled diesel engines

Learning Objectives:

The students have proper knowledge about the process of commercial vehicle development starting from the concept and the underlying original idea to the real design. They know that the customer requirements, the technical realisability, the functionality and the economy are important drivers.

The students are able to develop parts and components. Furthermore they have knowledge about different cab concepts, the interior and the interior design process. Consequently they are ready to analyze and to judge concepts of commercial vehicles as well as to participate competently in the commercial vehicle development.

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Termine und Nähere Informationen: siehe ILIAS oder Institutshomepage

Dates and further information will be published on the homepage of the institute.

Literature
1. Marwitz, H., Zittel, S.: ACTROS -- die neue schwere Lastwagenbaureihe von Mercedes-Benz, ATZ 98, 1996, Nr. 9

2. Alber, P., McKellip, S.: ACTROS -- Optimierte passive Sicherheit, ATZ 98, 1996

3. Morschheuser, K.: Airbag im Rahmenfahrzeug, ATZ 97, 1995, S. 450 ff.

V

Fundamentals in the Development of Commercial Vehicles II

Lecture (V)
On-Site

2114844, SS 2024, 1 SWS, Language: German, Open in study portal

Content
1. Gear boxes of commercial vehicles
2. Intermediate elements of the drive train
3. Axle systems
4. Front axles and driving dynamics
5. Chassis and axle suspension
6. Braking System
7. Systems
8. Excursion

Learning Objectives:

The students know the advantages and disadvantages of different drives. Furthermore they are familiar with components, such as transfer box, propeller shaft, powered and non-powered frontaxle etc. Beside other mechanical components, such as chassis, axle suspension and braking system, also electric and electronic systems are known. Consequently the student are able to analyze and to judge the general concepts as well as to adjust them precisely with the area of application.

Organizational issues
Genaue Termine sowie nähere Informationen und eventuelle Terminänderungen:

siehe Institutshomepage.

Literature

1.HILGERS, M.: Nutzfahrzeugtechnik lernen, Springer Vieweg, ISSN: 2510-1803

2.SCHITTLER, M.; HEINRICH, R.; KERSCHBAUM, W.: Mercedes-Benz Baureihe 500 – neue V-Motorengeneration für schwere Nutzfahrzeuge, MTZ 57 Nr. 9, S. 460 ff, 1996

3.Robert Bosch GmbH (Hrsg.): Bremsanalgen für Kraftfahrzeuge, VDI-Verlag, Düsseldorf, 1. Auflage, 1994

4.RUBI, V.; STRIFLER, P. (Hrsg. Institut für Kraftfahrwesen RWTH Aachen): Indiustrielle Nutzfahrzeugentwicklung, Schriftenreihe Automobiltechnik, 1993

5.TEUTSCH, R.; CHERUTI, R.; GASSER, R.; PEREIRA, M.; de SOUZA, A.; WEBER, C.: Fuel Efficiency Optimization of Market Specific Truck Applications, Proceedings of the 5th Commercial Vehicle Technology Symposium – CVT 2018

T 7.173 Course: Fundamentals of Automobile Development I [T-MACH-105162]

Responsible: Prof.Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2113810	Fundamentals of Automobile Development I	1 SWS	Lecture / 🗣	Frech
WT 23/24	2113851	Principles of Whole Vehicle Engineering I	1 SWS	Lecture / 🗣	Frech
Exams					
WT 23/24	76-T-MACH-105162	Fundamentals of Automobile Development I			Frech, Unrau
ST 2024	76-T-MACH-105162	Fundamentals of Automobile Development I			Frech, Gießler

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fundamentals of Automobile Development I

2113810, WS 23/24, 1 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Learning Objecitves:

The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Termine und nähere Informationen finden Sie auf der Institutshomepage.

Kann nicht mit Lehrveranstaltung 2113851 kombiniert werden.

Date and further information will be published on the homepage of the institute.

Cannot be combined with lecture 2113851.

Literature
Skript zur Vorlesung wird zu Beginn des Semesters ausgegeben

The scriptum will be provided during the first lessons

V

Principles of Whole Vehicle Engineering I

2113851, WS 23/24, 1 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Learning Objectives:

The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

Organizational issues
You will find the lecture material on ILIAS. To get the ILIAS password, KIT students refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Termine und nähere Informationen finden Sie auf der Institutshomepage.

Dats and further information will be published on the homepage of the institute.

Kann nicht mit Lehrveranstaltung 2113810 kombiniert werden

Cannot be combined with lecture 2113810.

Literature
Skript zur Vorlesung wird zu Beginn des Semesters ausgegeben

The scriptum will be provided during the first lessons

T 7.174 Course: Fundamentals of Automobile Development II [T-MACH-105163]

Responsible: Prof.Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Written examination	1,5	Grade to a third	Each summer term	2

Events					
ST 2024	2114842	Principles of Whole Vehicle Engineering II	1 SWS	Block / 🗣	Frech
ST 2024	2114860	Principles of Whole Vehicle Engineering II	1 SWS	/ 🗣	Frech
Exams					
WT 23/24	76-T-MACH-105163	Fundamentals of Automobile Development II			Frech, Unrau
ST 2024	76-T-MACH-105163	Fundamentals of Automobile Development II			Frech, Gießler

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Principles of Whole Vehicle Engineering II

2114842, SS 2024, 1 SWS, Language: German, Open in study portal

Block (B)
On-Site

Content
1. Application-oriented material and production technology I
2. Application-oriented material and production technology II
3. Overall vehicle acoustics in the automobile development
4. Drive train acoustics in the automobile development
5. Testing of the complete vehicle
6. Properties of the complete automobile

Learning Objectives:

The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

Organizational issues
Vorlesung findet als Blockvorlesung an folgenden Terminen statt: 02.05., 16.05., 06.06. 2024, jeweils von 08:00 bis 11:00 Uhr.

Kann nicht mit der Veranstaltung [2114860] kombiniert werden.

Cannot be combined with lecture [2114860].

Literature
Skript zur Vorlesung ist über ILIAS verfügbar.

V

Principles of Whole Vehicle Engineering II

2114860, SS 2024, 1 SWS, Language: English, Open in study portal

On-Site

Content

1. Application-oriented material and production technology I
2. Application-oriented material and production technology II
3. Overall vehicle acoustics in the automobile development
4. Drive train acoustics in the automobile development
5. Testing of the complete vehicle
6. Properties of the complete automobile

Learning Objectives:

The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

Organizational issues

Veranstaltung findet als Blockvorlesung an folgenden Terminen statt: 02.05., 16.05,, 06.06.2024 von 11:15 bis 14:00 Uhr.

Scheduled dates:

see homepage of the institute.

Kann nicht mit der Veranstaltung [2114842] kombiniert werden.

Cannot be combined with lecture [2114842].

Literature

Das Skript zur Vorlesung ist über ILIAS verfügbar.

T 7.175 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsible: Prof. Dr. Olaf Deutschmann
Prof. Dr. Jan-Dierk Grunwaldt
Dr.-Ing. Heiko Kubach
Hon.-Prof. Dr. Egbert Lox

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture / 🗣	Lox, Grunwaldt, Deutschmann

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Fundamentals of catalytic exhaust gas aftertreatment

2134138, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Blockvorlesung, Termin und Ort werden auf Ilias sowie der Homepage des IFKM und ITCP bekannt gegeben.

Literature
Skript, erhältlich in der Vorlesung

1. ''Environmental Catalysis'' Edited by G.Ertl, H. Knötzinger, J. Weitkamp Wiley-VCH Verlag GmbH, Weinheim, 1999 ISBN 3-527-29827-4
2. ''Cleaner Cars- the history and technology of emission control since the 1960s'' J. R. Mondt Society of Automotive Engineers, Inc., USA, 2000 Publication R-226, ISBN 0-7680-0222-2
3. ''Catalytic Air Pollution Control - commercial technology'' R. M. Heck, R. J. Farrauto John Wiley & Sons, Inc., USA, 1995 ISBN 0-471-28614-1
4. ''Automobiles and Pollution'' P. Degobert Editions Technic, Paris, 1995 ISBN 2-7108-0676-2
5. ''Reduced Emissions and Fuel Consumption in Automobile Engines'' F. Schaeder, R. van Basshuysen, Springer Verlag Wien New York, 1995 ISBN 3-211-82718-8
6. ''Autoabgaskatalysatoren : Grudlagen - Herstellung - Entwicklung - Recycling - Ökologie'' Ch. Hagelüken und 11 Mitautoren, Expert Verlag, Renningen, 2001 ISBN 3-8169-1932-4

T 7.176 Course: Fundamentals of National and International Group Taxation [T-WIWI-111304]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2560133	Fundamentals of National and International Group Taxation	3 SWS	Lecture / 🗣	Wigger, Gutekunst
Exams					
WT 23/24	790kobe	Fundamentals of National and International Group Taxation			Wigger
ST 2024	790kobe	Fundamentals of National and International Group Taxation			Wigger

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
It is recommended to attend the course “Basics of German Company Tax Law and Tax Planning” beforehand.

T 7.177 Course: Gear Cutting Technology [T-MACH-102148]

Responsible: Hon.-Prof. Dr. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2149655	Gear Technology	2 SWS	Lecture / 🗣	Klaiber
Exams					
WT 23/24	76-T-MACH-102148	Gear Technology			Klaiber

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Gear Technology

2149655, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Based on the gearing theory, manufacturing processes and machine technologies for producing gearings, the needs of modern gear manufacturing will be discussed in the lecture. For this purpose, various processes for various gear types are taught which represent the state of the art in practice today. A classification in soft and hard machining and furthermore in cutting and non-cutting technologies will be made. For comprehensive understanding the processes, machine technologies, tools and applications of the manufacturing of gearings will be introduced and the current developments presented. For assessment and classification of the applications and the performance of the technologies, the methods of mass production and manufacturing defects will be discussed. Sample parts, reports from current developments in the field of research and an excursion to a gear manufacturing company round out the lecture.

Learning Outcomes:

The students ...

- can describe the basic terms of gearings and are able to explain the imparted basics of the gearwheel and gearing theory.
- are able to specify the different manufacturing processes and machine technologies for producing gearings. Furthermore they are able to explain the functional principles and the dis-/advantages of these manufacturing processes.
- can apply the basics of the gearing theory and manufacturing processes on new problems.
- are able to read and interpret measuring records for gearings. are able to make an appropriate selection of a process based on a given application
- can describe the entire process chain for the production of toothed components and their respective influence on the resulting workpiece properties.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.
Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.178 Course: Global Logistics [T-MACH-111003]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-101282 - Global Production and Logistics
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2149600	Global Logistics	2 SWS	Lecture / 🗣	Furmans
Exams					
WT 23/24	76-T-MACH-105159	Global Production and Logistics - Part 2: Global Logistics / New: Global Logistics			Furmans

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Global Logistics

2149600, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Content:

Characteristics of global trade

- Incoterms
- Customs clearance, documents and export control

Global transport and shipping

- Maritime transport, esp. container handling
- Air transport

Modeling of supply chains

- SCOR model
- Value stream analysis

Location planning in cross-border-networks

- Application of the Warehouse Location Problem
- Transport Planning

Inventory Management in global supply chains

- Stock keeping policies
- Inventory management considering lead time and shipping costs

Media:

presentations, black board

Workload:

regular attendance: 21 hours
self-study: 99 hours

Students are able to:

- assign basic problems of planning and operation of global supply chains and plan them with apropriate methods,
- describe requirements and characteristics of global trade and transport, and
- evaluate characteristics of the design from logistic chains regarding their suitability.

Exam:

The exam consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The main exam is offered every summer semester. A second date for the exam is offered in winter semester only for students that did not pass the main exam.

Literature
Weiterführende Literatur:

- Arnold/Isermann/Kuhn/Tempelmeier. HandbuchLogistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren,Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, OldenbourgVerlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Neumann-Morlock. Operations-Research,Hanser-Verlag, 1993
- Tempelmeier. Bestandsmanagement in SupplyChains, Books on Demand 2006
- Schönsleben. IntegralesLogistikmanagement, Springer, 1998

T 7.179 Course: Global Manufacturing [T-WIWI-112103]

Responsible: Dr. Henning Sasse
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2581956	Global Manufacturing	2 SWS	Lecture /	Sasse
Exams					
WT 23/24	7981956	Global Manufacturing			Schultmann
ST 2024	7981956	Global Manufacturing			Schultmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be held for the first time in the winter semester 2022/23.

Below you will find excerpts from events related to this course:

V Global Manufacturing

2581956, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content

- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

Organizational issues
Blockveranstaltung, siehe Homepage

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.180 Course: Global Optimization I [T-WIWI-102726]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
Exams					
WT 23/24	7900004_WS2324_NK	Global Optimization I			Stein
ST 2024	7900205_SS2024_HK	Global Optimization I			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO). The successful completion of the exercises is required for admission to the written exam.

The exam is offered in the lecture of semester and the following semester.

The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

Prerequisites
None

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V **Global Optimization I** — **Lecture (V) On-Site**
2550134, SS 2024, 2 SWS, Language: German, Open in study portal

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature
O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.181 Course: Global Optimization I and II [T-WIWI-103638]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2024	2550134	Global Optimization I	2 SWS	Lecture / 🗣	Stein
ST 2024	2550135	Exercise to Global Optimization I and II	2 SWS	Practice / 🗣	Stein, Beck
ST 2024	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 23/24	7900006_WS2324_NK	Global Optimization I and II			Stein
ST 2024	7900207_SS2024_HK	Global Optimization I and II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Global Optimization I

2550134, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Algorithms (Kelley's cutting plane method, Frank-Wolfe method, primal-dual interior point methods)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *nonconvex* optimization problems forms the contents of the lecture "Global Optimization II". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the convex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the convex case in practice.

Literature
O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

V

Global Optimization II

2550136, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature
O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.182 Course: Global Optimization II [T-WIWI-102727]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2550136	Global Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 23/24	7900005_WS2324_NK	Global Optimization II			Stein
ST 2024	7900206_SS2024_HK	Global Optimization II			Stein

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V **Global Optimization II** — **Lecture (V) On-Site**
2550136, SS 2024, 2 SWS, Language: German, Open in study portal

Content
In many optimization problems from economics, engineering and natural sciences, solution algorithms are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via alphaBB method
- Branch-and-bound methods
- Lipschitz optimization

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of *convex* optimization problems forms the contents of the lecture "Global Optimization I". The lectures "Global Optimization I" and "Global Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands the fundamentals of deterministic global optimization in the nonconvex case,
- is able to choose, design and apply modern techniques of deterministic global optimization in the nonconvex case in practice.

Literature
O. Stein, Grundzüge der Globalen Optimierung, SpringerSpektrum, 2018.

Weiterführende Literatur:

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung, Teubner, 2004
- C.A. Floudas, Deterministic Global Optimization, Kluwer, 2000
- R. Horst, H. Tuy, Global Optimization, Springer, 1996
- A. Neumaier, Interval Methods for Systems of Equations, Cambridge University Press, 1990

T 7.183 Course: Global Production [T-MACH-110991]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	3

Events					
WT 23/24	2149613	Global Production	2 SWS	Lecture /	Lanza
Exams					
WT 23/24	76-T-MACH-110991	Global Production			Lanza
ST 2024	76-T-MACH-110991	Global Production			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
T-MACH-108848 - Globale Produktion und Logistik - Teil 1: Globale Produktion must not be commenced.
T-MACH-105158 - Globale Produktion und Logistik - Teil 1: Globale Produktion must not be commenced.
T-MACH-110337 - Globale Produktion und Logistik must not be commenced.

Below you will find excerpts from events related to this course:

V **Global Production**
2149613, WS 23/24, 2 SWS, Language: German, Open in study portal
Lecture (V)
Blended (On-Site/Online)

Content
The lecture examines the management of global production networks of manufacturing companies. It gives an overview of the influencing factors and challenges of global production. In-depth knowledge of common methods and procedures for planning, designing and managing global production networks is imparted.

Therefore, the lecture first of all discusses the connections and interdependencies between the business strategy and the production strategy and illustrates necessary tasks for the definition of a production strategy. Methods for site selection, for the site-specific adaptation of product design and production technology as well as for the establishment of new production sites and for the adaptation of existing production networks to changing framework conditions are subsequently taught within the context of the design of the network footprint. With regard to the management of global production networks, the lecture addresses challenges associated with coordination, procurement and order management in global networks. The lecture is complemented by a discussion on the use of industry 4.0 applications in global production and current trends in planning, designing and managing global production networks.

The topics include:

- Basic conditions and influencing factors of global production (historical development, targets, chances and threats)
- Framework for planning, designing and managing global production networks
- Production strategies for global production networks
    - From business strategy to production strategy
    - Tasks of the production strategy (product portfolio management, circular economy, planning of production depth, production-related research and development)
- Design of global production networks
    - Basic types of network structures
    - Planning process for the design of the network footprint
    - Adaptation of the network footprint
    - Site selection
    - Location-specific adaptation of production technology and product design
- Management of global production networks
    - Network coordination
    - Procurement process
    - Order management
- Trends in planning, designing and managing global production networks

Learning Outcomes:

The students …

- can explain the general conditions and influencing factors of global production
- are capable to apply defined procedures for site selection and to evaluate site decisions with the help of different methods
- are able to select the adequate scope of design for siteappropriate production and product construction casespecifically
- can state the central elements in the planning process of establishing a new production site.
- are capable to make use of the methods to design and scale global production networks for company-individual problems
- are able to show up the challenges and potentials of the departments sales, procurement as well as research and development on global basis.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Recommendations:
Combination with Global Production and Logistics – Part 2

Literature
Medien
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt

empfohlene Sekundärliteratur:
Abele, E. et al: Handbuch Globale Produktion, Hanser Fachbuchverlag, 2006 (deutsch)

Media
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

recommended secondary literature:
Abele, E. et al: Global Production – A Handbook for Strategy and Implementation, Springer 2008 (english)

T 7.184 Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Events					
WT 23/24	2500007		1,5 SWS	Practice /	Bakker
WT 23/24	2550484	Graph Theory and Advanced Location Models	3 SWS	Lecture /	Nickel
Exams					
WT 23/24	7900033	Graph Theory and Advanced Location Models			Nickel
ST 2024	7900283	Graph Theory and Advanced Location Models			Nickel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

Below you will find excerpts from events related to this course:

V Graph Theory and Advanced Location Models

2550484, WS 23/24, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Graph Theory is an important part of Discrete Mathematics. A special attraction is in its clearness and variety of proof techniques. Topic of the first part “Graph Theory” is the mediation of basic graph theoretical concepts and algorithms, which are deployed in many areas of operations research. In focus is the modeling of different problems with graph theoretical methods und their solutions with efficient algorithms. Significant focal points are shortest paths, flows, matchings, colorings and matroids. A variety of application areas of location theory has attracted increasing research interest within the last decades, because location decisions are a critical factor in strategic planning. In the second part “Advanced Location Models”, some current research questions of modern industrial location theory are discussed after a short introduction. Thereby, practical models and suitable solution methods for location problems in general networks are presented. The lecture goes into details about pareto solutions in networks, ordered median problems, covering problems and allocation problems.

Literature

- Jungnickel: Graphs, Networks and Algorithms, 2nd edition, Springer, 2005
- Diestel: Graph Theory, 3rd edition, Springer, 2006
- Bondy, Murty: Graph Theory, Springer, 2008
- Nickel, Puerto: Location Theory, Springer, 2005
- Drezner: Facility Location – Applications and Theory, 2nd edition, Springer, 2005

T 7.185 Course: Growth and Development [T-WIWI-112816]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation and Growth
M-WIWI-101496 - Growth and Agglomeration

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2561503	Growth and Development	2 SWS	Lecture / 🗣	Ott
WT 23/24	2561504	Exercise for Growth and Development	1 SWS	Practice / 🗣	Ott, Zoroglu
Exams					
WT 23/24	7900078	Growth and Development			Ott
ST 2024	7900105	Growth and Development			Ott

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as an open-book examination or as a 60-minute written examination.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Below you will find excerpts from events related to this course:

V **Growth and Development** — **Lecture (V) On-Site**
2561503, WS 23/24, 2 SWS, Language: German/English, Open in study portal

Content
This course is intended as an introduction to the field of advanced macroeconomics with a special focus on economic growth. Lectures aim to deal with the theoretical foundations of exogenous and endogenous growth models. The importance of growth for nations and discussion of some (well-known) growth theories together with the role of innovation, human capital and environment will therefore be primary focuses of this course.

Learning objective:

Students shall be given the ability to understand, analyze and evaluate selected models of endogenous growth theory.

Course content:

- Intertemporal consumption decision
- Growth models with exogenous saving rates: Solow
- Growth models with endogenous saving rates: Ramsey
- Growth and environmental resources
- Basic models of endogenous growth
- Human capital and economic growth
- Modelling of technological progress
- Diversity Models
- Schumpeterian growth
- Directional technological progress
- Diffusion of technologies

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Exam description:

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Literature
Auszug:

- Acemoglu, D. (2009): Introduction to modern economic growth. Princeton University Press, New Jersey.
- Aghion, P., Howitt, P. (2009): Economics of growth, MIT-Press, Cambridge/MA.
- Barro, R.J., Sala-I-Martin, X. (2003): Economic Growth. MIT-Press, Cambridge/MA.
- Sydsaeter, K., Hammond, P. (2008): Essential mathematics for economic analysis. Prentice Hall International, Harlow.
- Sydsæter, K., Hammond, P., Seierstad, A., Strom, A., (2008): Further Mathematics for Economic Analysis, Second Edition, Pearson Education Limited, Essex.

T 7.186 Course: Handling Characteristics of Motor Vehicles I [T-MACH-105152]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2113807	Handling Characteristics of Motor Vehicles I	2 SWS	Lecture /	Unrau
Exams					
WT 23/24	76-T-MACH-105152	Handling Characteristics of Motor Vehicles I			Unrau
ST 2024	76-T-MACH-105152	Handling Characteristics of Motor Vehicles I			Unrau

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Verbally

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Handling Characteristics of Motor Vehicles I

2113807, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
1. Problem definition: Control loop driver - vehicle - environment (e.g. coordinate systems, modes of motion of the car body and the wheels)

2. Simulation models: Creation from motion equations (method according to D'Alembert, method according to Lagrange, programme packages for automatically producing of simulation equations), model for handling characteristics (task, motion equations)

3. Tyre behavior: Basics, dry, wet and winter-smooth roadway

Learning Objectives:

The students know the basic connections between drivers, vehicles and environment. They can build up a vehicle simulation model, with which forces of inertia, aerodynamic forces and tyre forces as well as the appropriate moments are considered. They have proper knowledge in the area of tyre characteristics, since a special meaning comes to the tire behavior during driving dynamics simulation. Consequently they are ready to analyze the most importent influencing factors on the driving behaviour and to contribute to the optimization of the handling characteristics.

Organizational issues
Die Vorlesung wird als Videostream zur Verfügung gestellt. Sie finden den Videostream und das Vorlesungsmaterial auf ILIAS. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Literature

1. Willumeit, H.-P.: Modelle und Modellierungsverfahren in der Fahrzeugdynamik,
B. G. Teubner Verlag, 1998

2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R.; Unrau, H.-J.: Umdrucksammlung zur Vorlesung Fahreigenschaften von Kraftfahrzeugen I

T 7.187 Course: Handling Characteristics of Motor Vehicles II [T-MACH-105153]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2114838	Handling Characteristics of Motor Vehicles II	2 SWS	Lecture /	Unrau
Exams					
WT 23/24	76-T-MACH-105153	Handling Characteristics of Motor Vehicles II			Unrau
ST 2024	76-T-MACH-105153	Handling Characteristics of Motor Vehicles II			Unrau

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Handling Characteristics of Motor Vehicles II

2114838, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
1. Vehicle handling: Bases, steady state cornering, steering input step, single sine, double track switching, slalom, cross-wind behavior, uneven roadway

2. stability behavior: Basics, stability conditions for single vehicles and for vehicles with trailer

Learning Objectives:

The students have an overview of common test methods, with which the handling of vehicles is gauged. They are able to interpret results of different stationary and transient testing methods. Apart from the methods, with which e.g. the driveability in curves or the transient behaviour from vehicles can be registered, also the influences from cross-wind and from uneven roadways on the handling characteristics are well known. They are familiar with the stability behavior from single vehicles and from vehicles with trailer. Consequently they are ready to judge the driving behaviour of vehicles and to change it by specific vehicle modifications.

Organizational issues
Die Vorlesung wird als Videostream zur Verfügung gestellt. Sie finden den Videostream und das Vorlesungsmaterial auf ILIAS. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Literature
1. Zomotor, A.: Fahrwerktechnik: Fahrverhalten, Vogel Verlag, 1991

2. Mitschke, M./Wallentowitz, H.: Dynamik von Kraftfahrzeugen, Springer-Verlag, Berlin, 2004

3. Gnadler, R.; Unrau, H.-J.: Umdrucksammlung zur Vorlesung Fahreigenschaften von Kraftfahrzeugen II

T 7.188 Course: Heat Economy [T-WIWI-102695]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	2

Events					
ST 2024	2581001	Heat Economy	2 SWS	Lecture / 🗣	Fichtner
Exams					
WT 23/24	7981001	Heat Economy			Fichtner
ST 2024	7981001	Heat Economy			Fichtner

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written (60 minutes) or oral exam (30 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendation
None

Annotation
See German version.

Below you will find excerpts from events related to this course:

V **Heat Economy** — **Lecture (V) On-Site**
2581001, SS 2024, 2 SWS, Language: German, Open in study portal

Organizational issues
Block, Seminarraum Standort West - siehe Institutsaushang

T 7.189 Course: High Performance Powder Metallurgy Materials [T-MACH-102157]

Responsible: apl. Prof. Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2126749	Advanced powder metals	2 SWS	Lecture /	Schell
Exams					
WT 23/24	76-T-MACH-102157	High Performance Powder Metallurgy Materials			Schell, Wagner
ST 2024	76-T-MACH-102157	High Performance Powder Metallurgy Materials			Schell

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral exam, 20- 30 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V Advanced powder metals

2126749, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature

- W. Schatt ; K.-P. Wieters ; B. Kieback. ".Pulvermetallurgie: Technologien und Werkstoffe", Springer, 2007
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
- F. Thümmler, R. Oberacker. "Introduction to Powder Metallurgy", Institute of Materials, 1993

T 7.190 Course: High-Voltage Technology [T-ETIT-110266]

Responsible: Dr.-Ing. Rainer Badent
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101163 - High-Voltage Technology

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	2307360	High-Voltage Technology	2 SWS	Lecture / 🗣	Badent
WT 23/24	2307362	Tutorial for 2307362High-Voltage Technology	1 SWS	Practice / 🗣	Badent, Zajadatz
Exams					
WT 23/24	73730360	High-Voltage Technology			Badent
ST 2024	73730360	High-Voltage Technology			Badent

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.191 Course: High-Voltage Test Technique [T-ETIT-101915]

Responsible: Dr.-Ing. Rainer Badent
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101164 - Generation and Transmission of Renewable Power

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2307392	High-Voltage Test Technique	2 SWS	Lecture / 🗣	Badent
WT 23/24	2307394	Tutorial for 2307392 High-Voltage Test Technique	2 SWS	Practice / 🗣	Gielnik
Exams					
WT 23/24	7307392	High-Voltage Test Technique			Badent
ST 2024	7307392	High-Voltage Test Technique			Badent

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.192 Course: Human Factors in Autonomous Driving [T-WIWI-113059]

Responsible: Prof. Dr. Alexey Vinel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2511452	Human Factors in Autonomous Driving	2 SWS	Lecture / 🗣	Vinel, Bied, Schrapel
WT 23/24	2511453	Exercises Human Factors in Autonomous Driving	1 SWS	Practice / 🗣	Vinel, Bied, Schrapel
Exams					
WT 23/24	79AIFB_HFAD_C6	Human Factors in Autonomous Driving			Vinel
ST 2024	7900360	Human Factors in Autonomous Driving			Vinel

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) or an oral exam (20 min).

The exam takes place every semester and can be repeated at every regular examination date.

T 7.193 Course: Human Factors in Security and Privacy [T-WIWI-109270]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	3

Events					
WT 23/24	2511554	Human Factors in Security and Privacy	2 SWS	Lecture / 🗣	Volkamer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation. Only those who have successfully participated in the exercises and the lecture will be admitted to the examination.

Prerequisites
Both need to be done:

- Pass Quiz on Paper for Graphical Passwords
- Presentation of Results Exercise 2

+ 9 of the following 11 need to be done:

- Submit ILIAS certificate until Oct 24
- Pass Quiz on InfoSec Lecture
- Active participation exercise 1 Part 1 - Evaluation and analyses methods
- Pass Quiz Paper Discussion 1 - User Behaviour and motivation theories
- Active participation exercise 1 Part 2
- Pass Quiz Paper Discussion 2 - User Behaviour and motivation theories
- Pass Quiz Paper Discussion 3 - Security Awareness
- Active participation exercise 1 Part 3
- Pass Quiz Paper Discussion 4 - Graphical Authentication
- Pass Quiz Paper Discussion 5 - Shoulder Surfing Authentication
- Active participation exercise 2

Recommendation
The prior attendance of the lecture "Information Security" is strongly recommended.

Annotation
The lecture will not be offered in winter semester 2020/21.

Some lectures are in English, some in German.

Below you will find excerpts from events related to this course:

V **Human Factors in Security and Privacy** — **Lecture (V) On-Site**
2511554, WS 23/24, 2 SWS, Language: German/English, Open in study portal

Content
Please take a look at all the information provided before the first event (e.g. first slides)!

The event will be conducted with 3G. Accordingly, either a one-time proof of vaccination or an official proof of a negative test is required for each event.

Some lectures are in English, some in German.

To participate in the quizzes at the beginning of the event a charged device is needed e.g. laptop or cell phone.

To successfully pass the course, the following requirements must be met:

Both need to be done:

- Reading Paper, Active Participation & Pass Quiz on Paper for Graphical Passwords
- Presentation of Results Exercise 2

+ 9 of the following 11 need to be done:

- Submit ILIAS certificate until Oct 24
- Pass Quiz on InfoSec Lecture
- Active participation exercise 1 – Part 1
- Reading Paper, Active Participation & Pass Quiz “Users are not the enemy”Active participation exercise 1 – Part 2
- Reading Paper, Active Participation & Pass Quiz “Why Johnny can't encrypt”
- Reading Paper, Active Participation & Pass Quiz “Put Your Warning Where Your Link Is: Improving and Evaluating Email Phishing Warnings”
- Active participation exercise 1 – Part 3
- Active participation exercise 1 – Part 4 Results
- Reading Paper, Active Participation & Pass Quiz “User-centered security”Active participation exercise 2 – Part 1

Here is a first preview of the topics planned for the lecture:

1. General Introduction
2. Self-Study: Knowlege of Information Security Lecture
3. Terminology + Basics
4. Evaluation and analyses methods
5. Risk Communication
6. Security Awareness
7. Security Indicators
8. Graphical Authentication
9. Shoulder Surfing Authentication
10. Usable Verifiable Electronic Voting
11. Q&A + Exam preparation

Literature

- Usable Security: History, Themes, and Challenges (Synthesis Lectures on Information Security, Privacy, and Trust): Simson Garfinkel und Heather Richter Lipford. 2014
- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
- Melanie Volkamer, Karen Renaud: Mental Models - General Introduction and Review of Their Application to Human-Centred Security. In Number Theory and Cryptography (2013): 255-280: https://link.springer.com/chapter/10.1007/978-3-642-42001-6_18
- Paul Gerber, Marco Ghiglierie, Birgit Henhapl, Oksana Kulyk, Karola Marky, Peter Mayer, Benjamin Reinheimer, Melanie Volkamer: Human Factors in Security. In: Reuter C. (eds) Sicherheitskritische Mensch-Computer-Interaktion. Springer (2018) https://link.springer.com/chapter/10.1007/978-3-658-19523-6_5
- Bruce Schneier: Psychology of Security (2018): https://www.schneier.com/essays/archives/2008/01/the_psychology_of_se.html
- Ross Anderson: security /usability and psychology. In Security Engineering. http://www.cl.cam.ac.uk/~rja14/Papers/SEv2-c02.pdf
- Andrew Odlyzko: Economics, Psychology and Sociology of Security: http://www.dtc.umn.edu/~odlyzko/doc/econ.psych.security.pdf

T 7.194 Course: Hydrogen and reFuels - Energy Conversion in Combustion Engines [T-MACH-111585]

Responsible: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	2134155	Hydrogen and reFuels - Energy Conversion in Combustion Engines	2 SWS	Lecture / 🗣	Koch
Exams					
WT 23/24	7600092	Hydrogen and reFuels - Energy Conversion in Combustion Engines			Koch
ST 2024	76-T-MACH-105564	Hydrogen and reFuels - Energy Conversion in Combustion Engines			Koch, Kubach

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 25 minutes, no auxillary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Hydrogen and reFuels - Energy Conversion in Combustion Engines

2134155, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
New types of CO2-neutral fuels such as gaseous hydrogen but also liquid synthetic fuels often place specific requirements on engine systems that differ significantly from operation with conventional fuels. These special aspects of engine energy conversion are dealt with in this lecture.

Introduction

Thermodynamics of combustion engines

Fundamentals

gas exchange

Flow field

Wall heat losses

Combustion in gasoline engines

Pressure Trace Analysis

Combustion in Diesel engines

Specific Topics of Hydrogen Combsution

Waste heat recovery

T 7.195 Course: Ignition Systems [T-MACH-105985]

Responsible: Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Version
Oral examination	4	Grade to a third	1

Events					
WT 23/24	2133125	Ignition systems	2 SWS	Lecture / 🗣	Toedter

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, 20 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V Ignition systems

2133125, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Ignition Process
- Spark Ignition
- Principle of Spark Ignition Systems
- Limits of Spark Ignition
- New Develpoments of Spark Ignition Systems
- New an Alternative Ignition Systems

T 7.196 Course: Incentives in Organizations [T-WIWI-105781]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101505 - Experimental Economics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2573003	Incentives in Organizations	2 SWS	Lecture / 🗣	Nieken
ST 2024	2573004	Übung zu Incentives in Organizations	2 SWS	Practice / 🗣	Nieken, Mitarbeiter, Walther, Gorny
Exams					
WT 23/24	7900201	Incentives in Organizations			Nieken
ST 2024	7900132	Incentives in Organizations			Nieken

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min). The exam takesplace in every semester. Re-examinations are offered at every ordinaryexamination date. In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendation
Knowledge of microeconomics, game theory, and statistics is assumed.

Below you will find excerpts from events related to this course:

V Incentives in Organizations

2573003, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Aim
The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics.
- understands how econometric methods can be used to analyze performance and compensation data.
- knows incentive schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical data from companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Workload
The total workload for this course is: approximately 135 hours.

Lecture: 32 hours

Preparation of lecture: 52 hours

Exam preparation: 51 hours

Literature
Slides, Additional case studies and research papers will be announced in the lecture.

Literature (complementary):

Managerial Economics and Organizantional Architecture, Brickley / Smith / Zimmerman, McGraw-Hill Education, 2015

Behavioral Game Theory, Camerer, Russel Sage Foundation, 2003

Personnel Economics in Practice, Lazear / Gibbs, Wiley, 2014

Introduction to Econometrics, Wooldridge, Andover, 2014

Econometric Analysis of Cross Section and Panel Data, Wooldridge, MIT Press, 2010

T 7.197 Course: Information Engineering [T-MACH-102209]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	2

Events					
ST 2024	2122014	Information Engineering	2 SWS	Seminar /	Meyer, Mitarbeiter
Exams					
WT 23/24	76-T-MACH-102209	Information Engineering			Ovtcharova, Meyer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (written composition and speech)

Prerequisites
None

Below you will find excerpts from events related to this course:

V Information Engineering

2122014, SS 2024, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Seminar papers on current research topics of the Institute for Information Management in Engineering. The respective topics are presented at the beginning of each semester.

Organizational issues
Siehe ILIAS-Kurs

Literature
Themenspezifische Literatur

T 7.198 Course: Information Management for Public Mobility Services [T-BGU-106608]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
WT 23/24	6232905	Informationsmanagement für öffentliche Mobilitätsangebote	2 SWS	Block / 🗣	Vortisch
Exams					
WT 23/24	8245106608	Information Management for Public Mobility Services			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
lecture accompanying exercises, appr. 5 pieces

Prerequisites
none

Recommendation
none

Annotation
none

T 7.199 Course: Information Service Engineering [T-WIWI-106423]

Responsible: Prof. Dr. Harald Sack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2511606	Information Service Engineering	2 SWS	Lecture / 🗣	Sack
ST 2024	2511607	Exercises to Information Service Engineering	1 SWS	Practice / 🗣	Sack
Exams					
WT 23/24	79AIFB_ISE_B2	Information Service Engineering			Sack
ST 2024	79AIFB_ISE_B3	Information Service Engineering (Registration until 15 July 2024)			Sack

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Below you will find excerpts from events related to this course:

V **Information Service Engineering** — **Lecture (V) On-Site**
2511606, SS 2024, 2 SWS, Language: English, Open in study portal

Content
- The Art of Understanding

- From Numbers to Insights
- Data, Information, and Knowledge
- Natural Language
- What is Successful Communication?
- The Art of Understanding

- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques and Challenges
- How to evaluate an NLP Experiment?
- Tokenization and Word Normalisation
- Statistical Language Models (N-Gram Model)
- Naive Bayes Text Classification
- Distributional Semantics and Word Vectors

- Knowledge Graphs

- Knowledge Representations and Ontologies
- Resource Description Framework (RDF)
- Modeling with RDFS
- Querying RDF(S) with SPARQL
- Popular Knowledge Graphs - Wikidata and DBpedia
- Ontologies with the Web Ontology Language (OWL)
- Linked Data Quality Assurance with SHACL
- From Linked Data to Knowledge Graphs

- Basic Machine Learning

- Machine Learning Fundamentals
- Evaluation and Generalization Problems
- Linear Regression
- Decision Trees
- Unsupervised Learning
- Neural Networks and Deep Learning
- Word Embeddings
- Knowledge Graph Embeddings

- ISE Applications

- Knowledge Graph Completion
- Knowledge Graphs and Large Language Models
- Semantic and Exploratory Search
- Semantic Recommender Systems

Learning objectives:

- The students know the fundamentals and measures of information theory and are able to apply those in the context of Information Service Engineering.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students have fundamental skills of information retrieval and are enabled to conduct and to evaluate simple information retrieval tasks.
- The students apply their skills of natural language processing, Linked Data engineering, and Information Retrieval to conduct and evaluate simple knowledge mining tasks.
- The students know the fundamentals of recommender systems as well as of semantic and exploratory search.

Literature

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- A. Hogan, The Web of Data, Springer, 2020.
- G. Rebala, A. Ravi, S. Churiwala, An Introduction to Machine Learning, Springer, 2019.

T 7.200 Course: Information Systems and Supply Chain Management [T-MACH-102128]

Responsible: Dr.-Ing. Christoph Kilger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites
none

T 7.201 Course: Infrastructure Management [T-BGU-106300]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100998 - Design, Construction, Operation and Maintenance of Highways
M-BGU-100999 - Highway Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each term	1

Events					
ST 2024	6233801	Design and Construction of Roads	2 SWS	Lecture / 🗣	Plachkova-Dzhurova, Zimmermann
ST 2024	6233802	Operation and Maintenance of Roads	2 SWS	Lecture / 🗣	Plachkova-Dzhurova, Zimmermann
Exams					
WT 23/24	8245106300	Infrastructure Management			Zimmermann

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 120 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.202 Course: Innovation and Project Management in Rail Vehicle Engineering [T-MACH-113068]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106496 - Modern Mobility on Rails and Roads

Type	Credits	Grading scale	Version
Examination of another type	4,5	Grade to a third	3

Events					
WT 23/24	2115921	Innovation and Project Management with Case Study "Innovative Rail Vehicle"	2 SWS	Lecture / 🗣	Cichon
ST 2024	2115921	Innovation and Project Management with Case Study "Innovative Rail Vehicle"	2 SWS	Lecture / 🗣	Cichon, Berthold
Exams					
WT 23/24	76-T-MACH-106427	Innovation and Project Management in Rail Vehicle Engineering			Cichon
ST 2024	76-T-MACH-106427	Innovation and Project Management in Rail Vehicle Engineering			Cichon, Berthold

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Presentation (duration approx. 20 minutes) and colloquium

T 7.203 Course: Innovation Lab [T-ETIT-110291]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Prof. Dr. Werner Nahm
Prof. Dr.-Ing. Eric Sax
Prof. Dr. Wilhelm Stork
Prof. Dr.-Ing. Thomas Zwick

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-WIWI-105011 - Student Innovation Lab (SIL) 2

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	9	Grade to a third	Each winter term	2 terms	1

Events					
WT 23/24	2303192	Innovation Lab	2 SWS	Project (P / 🗣	Hohmann, Zwick, Sax, Stork, Nahm
ST 2024	2303192	Innovation Lab	2 SWS	Project (P / 🗣	Hohmann, Zwick, Sax, Stork, Terzidis
Exams					
WT 23/24	7303192	Innovation Lab			Hohmann, Zwick, Stork, Sax, Nahm

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
see module description

T 7.204 Course: Innovation Management: Concepts, Strategies and Methods [T-WIWI-102893]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2545100	Innovation Management: Concepts, Strategies and Methods	2 SWS	Lecture / 🔀	Weissenberger-Eibl
Exams					
WT 23/24	7900145	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl
ST 2024	7900144	Innovation Management: Concepts, Strategies and Methods			Weissenberger-Eibl

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Innovation Management: Concepts, Strategies and Methods

2545100, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application. The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particularly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addition to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of integrated knowledge.

Aim: Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

Organizational issues
Wichtig! Bitte treten Sie dem **ILIAS-Kurs zur Vorlesung** bei, damit wir Ihnen weitere Informationen mitteilen können.

Literature
Eine ausführliche Literaturliste wird mit den Vorlesungsunterlagen zur Verfügung gestellt.

Eine Einführung bei: Vahs,D./Brem,A. (2013): Innovationsmanagement. Von der Idee zur erfolgreichen Vermarktung, 4. Auflage, Stuttgart 2013.

T 7.205 Course: Integrated Design Project in Water Resources Management [T-BGU-111275]

Responsible: PD Dr.-Ing. Uwe Ehret
Dr.-Ing. Frank Seidel
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	6	Grade to a third	Each term	1 terms	1

Events					
ST 2024	6224801	Integrated Design Project in Water Resources Management	4 SWS	Lecture / Practice (/ 🗣	Ehret, Seidel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
project work, report approx. 15 pages with presentation approx. 15 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.206 Course: Integrated Product Development [T-MACH-105401]

Responsible: Prof. Dr.-Ing. Albert Albers
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102626 - Major Field: Integrated Product Development

Type	Credits	Grading scale	Recurrence	Version
Oral examination	18	Grade to a third	Each winter term	2

Events					
WT 23/24	2145156	Lecture: IP – Integrated Product Development	4 SWS	Lecture / 🗣	Albers
WT 23/24	2145157	Workshop: IP – Integrated Product Development	4 SWS	Practice / 🗣	Albers
WT 23/24	2145300	Project Work: IP - Integrated Product Development	2 SWS	Others (sons / 🗣	Albers
Exams					
WT 23/24	76-T-MACH-105401	Integrated Product Development			Albers

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (60 minutes)

Prerequisites
none

Annotation
Due to organizational reasons, the number of participants is limited. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK hompage from april to july. The selection itself is made by Prof. Albers in personal interviews.

Below you will find excerpts from events related to this course:

V Lecture: IP – Integrated Product Development

2145156, WS 23/24, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Registration required in the previous summer semester. The lecture starts in first week of October.

Prerequisites:

The participation in "Integrated Product Development" requires the concurrent participation in lectures (2145156), tutorials (2145157) and project work (2145300).

Due to organizational reasons, the number of participants is limited. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK hompage from april to july. The selection itself is made by Prof. Albers in personal interviews.

Recommendations:

none

Workload:

regular attendance: 84 h

self-study: 288 h

Examination:

oral examination (60 minutes)

combined examination of lectures, tutorials and project work

Course content:

organizational integration: integrated product engineering model, core team management and simultaneous engineering

informational integration: innovation management, cost management, quality management and knowledge management

personal integration: team coaching and leadership management

invited lectures

Learning objectives:

The Students are able to ...

- analyze and evaluate product development processes based on examples and their own experiences.
- plan, control and evaluate the working process systematically.
- choose and use suitable methods of product development, system analysis and innovation management under consideration of the particular situation.
- prove their results.
- develop complex technical solutions in a team and to present them to qualified persons as well as non-qualified persons
- to design overall product development processes under consideration of market-, customer- and company- aspects

Literature
Klaus Ehrlenspiel - Integrierte Produktentwicklung. Denkabläufe, Methodeneinsatz, Zusammenarbeit, Hanser Verlag, 2009

V **Workshop: IP – Integrated Product Development** **Practice (Ü) On-Site**
2145157, WS 23/24, 4 SWS, Language: German, Open in study portal

Content
Prerequisites:

The participation in "Integrated Product Development" requires the concurrent participation in lectures (2145156), tutorials (2145157) and project work (2145300).

Due to organizational reasons, the number of participants is limited to 42 persons. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK hompage from april to july. The selection itself is made by Prof. Albers in personal interviews.

Recommendations:

none

Workload:

regular attendance: 84 h

self-study: 288 h

Examination:

lectures: 21 h

preparation to exam: 99 h

Course content:

problem solving: analysis techniques, creativity techniques and evaluation methods

professional skills: presentation techniques, moderation and teamcoaching

development tools: MS Project, Szenario-Manager & Pro/Engineer Wildfire

Learning objectives:

The theoretical background taught in the lecture, is deepened through methodworkshops, business games and case studies. The reflexion of the onself precedure allows for an applicability and practicability of the contents in the accompnying development project as well as for the career entry.

Literature

Klaus Ehrlenspiel - Integrierte Produktentwicklung. Denkabläufe, Methodeneinsatz, Zusammenarbeit, Hanser Verlag, 2009

V **Project Work: IP - Integrated Product Development** **Others (sonst.)**
2145300, WS 23/24, 2 SWS, Language: German, Open in study portal **On-Site**

Content
Participation only possible in combination with the lecture 2145156 'Integrated Product Development'.

Prerequisites:

The participation in "Integrated Product Development" requires the concurrent participation in lectures (2145156), tutorials (2145157) and project work (2145300).

Due to organizational reasons, the number of participants is limited to 42 persons. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK hompage from april to july. The selection itself is made by Prof. Albers in personal interviews.

Recommendations:

none

Workload:

regular attendance: 21 h

self-study: 99 h

Examination:

oral examination (60 minutes)

combined examination of lectures, tutorials and project work

Course content:

The project work begins with the early stages of product development, i.e. the identification of market trends and needs. Based on this information the students develop scenarios for future markets and create product profiles, which describe the customers and their demands without anticipating possible product solutions. After having passed several following milestones for ideas, concepts and designs, virtual prototypes and function prototypes are presented to an audience.
The project work is supported by coaching through skilled faculty staff. Additionally weekly tutorials, respectively workshops are given. For doing the project the teams gain access to team workspaces featuring IT-infrastructure and relevant software, such as office, CAD or FEA. Further on the teams learn how team cooperation and knowledge management can be supported in design project by using a wiki system.s

Learning objectives:

The center of "Integrated Product Development" constitutes itself in the development of a technical product within independent working student teams on the basis of the market situation up to virtual and real prototypes. Thereby the integrate treatment of the product development process is of importance. The project teams hereby represent development departments of medium sized companies, in which the presented methods and tools are field - experienced applied and ideas are transformed into concrete product models.
For the preparation of this development project the basics of 3D-CAD-modelling (Pro/ENGINEER) as well as different tools and methods of creative designing, of sketching and solution finding are mediated in workshops. Special events impart an insight of presentation techniques and the meaning of technical design.

T 7.207 Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-109054]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101272 - Integrated Production Planning

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2024	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (/ 🗣	Lanza
Exams					
WT 23/24	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza
ST 2024	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0			Lanza

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (120 min)

Prerequisites
"T-MACH-108849 - Integrierte Produktionsplanung im Zeitalter von Industrie 4.0" as well as "T-MACH-102106 Integrierte Produktionsplanung" must not be commenced.

Below you will find excerpts from events related to this course:

V **Integrated Production Planning in the Age of Industry 4.0** — **Lecture / Practice (VÜ) On-Site**
2150660, SS 2024, 6 SWS, Language: German, Open in study portal

Content
Integrated Production Planning in the age of Industry 4.0 will be taught in the context of this engineering science lecture. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the lecture:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (PPS, process simulation as a validation tool, planning of conveyor technology and storage systems for linking production and IT systems in the I4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The lecture contents are complemented by numerous current practical examples with a strong Industry 4.0 reference. Aspects of sustainability are anchored in all units and thus basic knowledge of sustainable production planning is taught. Within the exercises the lecture contents are deepened and applied to specific problems and tasks.

Learning Outcomes:

The students …

- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.
- know the basic features of sustainable production planning and can apply underlying knowledge.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine dienstags 14.00 Uhr und donnerstags 14.00 Uhr, Übungstermine donnerstags 15.45 Uhr. Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.208 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Responsible: Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture / 🗣	Schlichtenmayer
Exams					
WT 23/24	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer
ST 2024	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars			Schlichtenmayer

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Integrative Strategies in Production and Development of High Performance Cars

Lecture (V)
On-Site

2150601, SS 2024, 2 SWS, Language: German, Open in study portal

Content
The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:

- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrative R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Learning Outcomes:

The students …

- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.209 Course: Intelligent Agent Architectures [T-WIWI-111267]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2540525	Intelligent Agent Architectures	2 SWS	Lecture / 🗣	Geyer-Schulz
WT 23/24	2540526	Übung zu Intelligent Agent Architectures	1 SWS	Practice / 🗣	Geyer-Schulz, Schweizer
Exams					
WT 23/24	79011480	Intelligent Agent Architectures (WS 2023/2024)			Geyer-Schulz
ST 2024	7900069	Intelligent Agent Architectures (Nachklausur WS 2023/2024)			Geyer-Schulz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
It is recommended to additionally review the Bachelor-level lecture "Customer Relationship Management" from the module "CRM and Servicemanagement".

Below you will find excerpts from events related to this course:

V Intelligent Agent Architectures

2540525, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Course content:

The lecture is structured in three parts:

In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload:

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Learning Goals:

Students have special knowledge of software architectures and of the methods which are used in their development (Systems analysis, formal methods for the specification of interfaces and algebraic semantic, UML, and, last but not least, the mapping of conceptual architectures to IT architectures.

Students know important architectural patterns and they can – based on their CRM knowledge – combine these patterns for innovative CRM applications.

Assessment:

The assessment consists of a written exam of 1-hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from exercise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: 0

Literature

- P. Clements *u. a.*, *Documenting Software Architectures. Views and Beyond*. Upper Saddle River: Addison-Wesley, 2011.
- Fowler, *Patterns of Enterprise Application Architecture*. Amsterdam: Addison-Wesley Longman, 2002.
- S. Russell und P. Norvig, *Artificial Intelligence: A Modern Approach*, 3. Aufl. Harlow Essex England: Pearson New International Edition, 2014.
- V. N. Vapnik, *The Nature of Statistical Learning Theory*. New York: Springer, 1995.

T 7.210 Course: Intelligent Agents and Decision Theory [T-WIWI-110915]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2540537	Intelligent Agents and Decision Theory	2 SWS	Lecture	Geyer-Schulz
ST 2024	2540538	Übung zu Intelligent Agents and Decision Theory	1 SWS	Practice	Schweizer
Exams					
WT 23/24	7900294	Intelligent Agents and Decision Theory (Nachklausur SS 2023)			Geyer-Schulz
ST 2024	7900306	Intelligent Agents and Decision Theory			Geyer-Schulz

Competence Certificate
Oral (30 minutes) or written examination (60 minutes). The exam is held in each semester and can be repeated at any regular examination date.Details of the grading system and any exam bonus that may be achieved from the practice are announced in the course.

Prerequisites
None

Recommendation
We assume knowledge in statistics, operations research and microeconomics as taught in the Bachelor program (VWL I, Operations Research I + II, Statistics I + II) and a familiarity with preferably the Python programming language.

Annotation
new lecture starting summer semester 2020

Below you will find excerpts from events related to this course:

V **Intelligent Agents and Decision Theory** — **Lecture (V)**
2540537, SS 2024, 2 SWS, Language: English, Open in study portal

Content
The key assumption of this lecture is that the concept of artificial intelligence is inseparably linked to the economic concept of rationality of agents. We consider different classes of decision problems - decisions under certainty, risk and uncertainty - from an economic, managerial and AI-engineering perspective:

From an economic point of view, we analyze how to act rationally in these situations based on classic utility theory. In this regard, the course also introduces the relevant parts of decision theory for dealing with

- multiple conflicting objectives,
- incomplete, risky and uncertain information about the world,
- assessing utility functions, and
- quantifying the value of information ...

From an engineering perspective, we discuss how to develop practical solutions for these decision problems, using appropriate AI components. We introduce

- a general, agent-based design framework for AI systems,

as well as AI methods from the fields of

- search (for decisions under certainty),
- inference (for decions under risk) and
- learning (for decisions under uncertainty).

Where applicable, the course highlights the theoretical ties of these methods with decision theory.

We conclude with a discussion of ethical and philosophical issues concerning the development and use of AI.

Learning objectives

Students are able to design, analyze, implement, and evaluate intelligent agents.

Lecture Outline

1. Introduction: Artificial intelligence and the economic concept of rationality
2. Intelligent Agents: A general, agent-based design framework for AI systems
3. Decision under certainty: Assessing utility functions for decisions with multiple objectives
4. Search: Linear programming for decisions under certainty
5. Decisions under risk: The expected utility principle
6. Information systems: Improving economic decisions under risk
7. Inference: Bayesian networks for decisions under risk
8. Information Learning objectives value: When should an agent gather new information?
9. Decisions under uncertainty: Complete lack of information
10. Learning: Statistical learning of bayesian networks
11. Learning: Supervised learning with neural networks
12. Learning: Reinforcement learning
13. Learning: Preference-based reinforcement learning
14. Discussion: Ethical and philosophical issues

Note: This rough outline may be subject to change.

Literature
Basic literature (by lecture):

1. Russell & Norvig (2016, chapter 1), Bamberg et al. (2019, chapters 1 & 2)
2. Russell & Norvig (2016, chapter 2)
3. Keeney & Raiffa (1993, chapter 3)
4. Nickel et al. (2014, chapter 1) [German], Russell & Norvig (2016, chapter 3)
5. Bamberg et al. (2019, chapter 4), Fishburn (1988)
6. Bamberg et al. (2019, chapter 6)
7. Russell & Norvig (2016, chapters 13, 14, 16)
8. Russell & Norvig (2016, chapter 16), Bamberg et al. (2019, chapter 6)
9. Bamberg et al. (2019, chapter 5)
10. Russell & Norvig (2016, chapter 20)
11. Goodfellow et al. (2016, chapter 6)
12. Sutton & Barto (2018, chapter 3)
13. Wirth et al. (2017)
14. Russell & Norvig (2016, chapter 26)

Detailed references:

Bamberg, Coenenberg & Krapp (2019). Betriebswirtschaftliche Entscheidungslehre (16th ed.). Verlag Franz Vahlen GmbH.

Fishburn (1988). Nonlinear preference and utility theory. Baltimore: Johns Hopkins University Press.

Goodfellow, Bengio & Courville (2016). Deep learning. Cambridge: MIT press.

Keeney & Raiffa (1993). Decisions with multiple objectives: preferences and value trade-offs. Cambridge University Press.

Nickel, S., Stein, O., & Waldmann, K.-H. (2014). Operations Research (2nd ed.). Springer Berlin Heidelberg.

Russell & Norvig (2016). Artificial Intelligence: A Modern Approach (3rd Global Edition). Pearson.

Sutton & Barto (2018). Reinforcement learning: An introduction. Cambridge: MIT press.

Wirth, Akrour, Neumann & Fürnkranz (2017). A Survey of Preference-Based Reinforcement Learning Methods. Journal of Machine Learning Research, 18(1), 1–46.

T 7.211 Course: International Business Development and Sales [T-WIWI-110985]

Responsible: Erice Casenave
Prof. Dr. Martin Klarmann
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	see Annotations	1

Events					
WT 23/24	2572189	International Business Development and Sales	4 SWS	Block / 🗣	Klarmann, Terzidis, Schmitt

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Non exam assessment. The grade is based on the presentation, the subsequent discussion and the written elaboration.

Annotation
Please contact the Marketing and Sales Research Group for further information.

Below you will find excerpts from events related to this course:

V International Business Development and Sales

2572189, WS 23/24, 4 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content
This course is offered as part of the EUCOR programme in cooperation with EM Strasbourg. Max. 10 students of KIT and max. 10 students of EM Strasbourg will develop a sales presentation in tandems (teams of 2). This is based on the value proposition of a business model.

- An application is required to participate in this event. The application phase usually takes place at the beginning of the lecture period. Further information on the application process can be found on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the start of the lecture period.

Total workload for 6 ECTS: about 180 hours.

T 7.212 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	1

Events					
ST 2024	2530570	International Finance	2 SWS	Lecture / 🗣	Walter, Uhrig-Homburg
Exams					
WT 23/24	7900052	International Finance			Uhrig-Homburg

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 60-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

Recommendation
None

Annotation
The course is offered as a 14-day or block course.

Below you will find excerpts from events related to this course:

V International Finance

2530570, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Kickoff am Mittwoch, 24.04.24, 15:45 - 19:00 Uhr im Raum 320 im Geb. 09.21 (Blücherstr. 17). Die Veranstaltung wird samstags als Blockveranstaltung angeboten, nach dem Kickoff nach Absprache.

Literature
Weiterführende Literatur:

- Eiteman, D. et al., Multinational Business Finance, 13. Auflage, 2012.
- Solnik, B. und D. McLeavey, Global Investments, 6. Auflage, 2008.

T 7.213 Course: Internet Law [T-INFO-101307]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	2

Events					
WT 23/24	24354	Internet Law	2 SWS	Lecture /	Sattler
Exams					
WT 23/24	7500060	Internet Law			Sattler
ST 2024	7500057	Internet Law			Sattler

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 7.214 Course: Introduction to Bayesian Statistics for Analyzing Data [T-WIWI-110918]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
WT 23/24	2500025	Bayesian Statistics for Analyzing Data	2 SWS	Seminar	Scheibehenne

Competence Certificate
Grades will be based on active participation (50%) and homework assignments (50%).

Prerequisites
Participants should already have a basic knowledge of R and standard frequentist statistical tests. Please bring your own Laptop with you as we will be using R for several hands-on examples and exercises during the class. We will mainly work with the book "Statistical Rethinking. A Bayesian Course with Examples in R and Stan" by Richard McElrath. Students are advised to obtain the book before the class starts.

Annotation
Due to its interactive nature, the number of participants will be limited.

Below you will find excerpts from events related to this course:

V Bayesian Statistics for Analyzing Data

2500025, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The goal of this class is to introduce Bayesian statistics as a viable alternative to conventional Null-Hypothesis significance testing (NHST) and the calculation of p-values. The class introduces the theoretical background of Bayesian statistics and its advantages over NHST. Based on this, students will work through hands-on approaches for analyzing various empirical data using Bayesian statistics. These analyses will mainly be conducted with the statistics software R and JASP. The class provides participants with the necessary skills to evaluate and interpret the results of published Bayesian analyses and to use the method for testing hypotheses and estimating model parameters based on empirical data. There will be regular reading and homework assignments.

T 7.215 Course: Introduction to Bionics [T-MACH-111807]

Responsible: apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS
M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Events					
ST 2024	2142151	Introduction to Biomimetics	2 SWS	Lecture / 🗣	Hölscher, Greiner
Exams					
WT 23/24	76-T-MACH-102172	Introduction into Biomimetics			Hölscher

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam (duration: 60 minutes)

Prerequisites
none

Annotation
Brick T-MACH-102172 may not be started

Below you will find excerpts from events related to this course:

V Introduction to Biomimetics

2142151, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.

The students should be able analyze, judge, plan and develop biomimetic strategies and products.

Basic knowledge in physics and chemistry

The successfull attandence of the lecture is controlled by a written examination.

Organizational issues
Im ILIAS werden Materialien (Videos, Originalliteratur, Übungen) zur Vertiefung zur Verfügung gestellt.

Für die schriftliche Klausur werden zwei Termine angeboten (erste Woche nach Vorlesungsende im Sommersemester und eine Woche vor Vorlesungsbeginn im Wintersemester).

Literature
Folien und Literatur werden in ILIAS zur Verfügung gestellt.

T 7.216 Course: Introduction to Ceramics [T-MACH-100287]

Responsible: apl. Prof. Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 23/24	2125757	Introduction to Ceramics	3 SWS	Lecture /	Schell
Exams					
WT 23/24	76-T-MACH-100287	Introduction to Ceramics			Schell, Bucharsky, Wagner
ST 2024	76-T-MACH-100287	Introduction to Ceramics			Schell, Bucharsky, Wagner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (30 min) taking place at a specific date.

The re-examination is offered at a specific date.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Introduction to Ceramics

2125757, WS 23/24, 3 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature

- H. Salmang, H. Scholze, "Keramik", Springer
- Kingery, Bowen, Uhlmann, "Introduction To Ceramics", Wiley
- Y.-M. Chiang, D. Birnie III and W.D. Kingery, "Physical Ceramics", Wiley
- S.J.L. Kang, "Sintering, Densification, Grain Growth & Microstructure", Elsevier

T 7.217 Course: Introduction to Food Law [T-CHEMBIO-108091]

Responsible: Prof. Dr. Thomas Kuballa
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1,5	pass/fail	Each winter term	2

Events					
WT 23/24	6627	Einführung in das Lebensmittelrecht	1 SWS	Lecture	Kuballa
Exams					
WT 23/24	71B108091	Introduction to Food Law			Kuballa
WT 23/24	71B108091-2	Introduction to Food Law			Kuballa

Prerequisites
none

T 7.218 Course: Introduction to Hydrogeology [T-BGU-101499]

Responsible: Prof. Dr. Nico Goldscheider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 23/24	6339050	Einführung in die Hydrogeologie	4 SWS	Lecture / Practice (/ 🗣	Goldscheider
Exams					
WT 23/24	8210_101499	Introduction to Hydrogeology			Goldscheider
ST 2024	8210_101499_	Introduction to Hydrogeology			Goldscheider

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam with 90 minutes

Prerequisites
none

T 7.219 Course: Introduction to Microsystem Technology - Practical Course [T-MACH-108312]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS
M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics
M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each term	1

Events					
WT 23/24	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
ST 2024	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
Exams					
WT 23/24	76-T-MACH-108312	Introduction to Microsystem Technology - Practical Course			Last

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
non-graded written examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Introduction to Microsystem Technology - Practical Course** — **Practical course (P) On-Site**
2143877, WS 23/24, 2 SWS, Language: German, Open in study portal

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V **Introduction to Microsystem Technology - Practical Course** — **Practical course (P) On-Site**
2143877, SS 2024, 2 SWS, Language: German, Open in study portal

Content
In the practical training includes nine experiments:

1. X-ray optics
2. UVL + REM
3. Micromixer
4. Atomic force microscopy
5. 3D-Printing
6. Light dirffraction at Chromium masks
7. Moulding
8. SAW-bio-sensors
9. Nano3D-printer - material transfer of thin foils
10. Electro spinning

Each student takes part in only four experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Organizational issues
Das Praktikum findet in den Laboren des IMT am KIT-CN statt. Treffpunkt: Eingang Bau 301.

Teilnahmeanfragen an Dr. A. Last, arndt.last@kit.edu

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 7.220 Course: Introduction to Microsystem Technology I [T-MACH-105182]

Responsible: Dr. Vlad Badilita
Dr. Mazin Jouda
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-ETIT-101158 - Sensor Technology I
M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2141861	Introduction to Microsystem Technology I	2 SWS	Lecture / 🗣	Korvink, Badilita
Exams					
WT 23/24	76-T-MACH-105182	Introduction to Microsystem Technology I			Korvink, Badilita
ST 2024	76-T-MACH-105182	Introduction to Microsystem Technology I			Korvink, Badilita

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written examination (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Introduction to Microsystem Technology I

2141861, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Mikrosystemtechnik für Ingenieure, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.221 Course: Introduction to Microsystem Technology II [T-MACH-105183]

Responsible: Dr. Mazin Jouda
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-ETIT-101158 - Sensor Technology I
M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2142874	Introduction to Microsystem Technology II	2 SWS	Lecture / 🗣	Korvink, Badilita
Exams					
WT 23/24	76-T-MACH-105183	Introduction to Microsystem Technology II			Korvink, Badilita
ST 2024	76-T-MACH-105183	Introduction to Microsystem Technology II			Korvink, Badilita

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written examination (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Introduction to Microsystem Technology II

2142874, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

Organizational issues
Topic: Grundlagen der Mikrosystemtechnik II (MST II) SS 21
Time: Thursdays 14:00 - 15:30

10.91 Redtenbacher-Hörsaal

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011

T 7.222 Course: Introduction to nanotechnology [T-MACH-111814]

Responsible: apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering
KIT Department of Economics and Management
Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	2

Events					
ST 2024	2142152	Introduction to Nanotechnology	2 SWS	Lecture / 🗣	Hölscher

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam 90 min

Prerequisites
none

Annotation
Brick T-MACH-111814 may not be started

Below you will find excerpts from events related to this course:

V Introduction to Nanotechnology

2142152, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Nanotechnology deals with the fabrication and analysis of nanostructures. The topics of the lecture include

- the most common measurement principles of nanotechnology especially scanning probe methods
- the analysis of physical and chemical properties of surfaces
- interatomic forces and their influence on nanostructures
- methods of micro- and nanofabrication and lithography
- basic models of contact mechanics and nanotribology
- important functional characteristics of nanodevices

Basic knowledge in mathematics and physics is assumed

The successfull attandence of the lecture is controlled by a 30 minutes oral exam.

Organizational issues
Es werden im ILIAS Materialien (Videos, Originalliteratur, Übungen) zum Vertiefung zur Verfügung gestellt.

Für die mündlichen Prüfungen werden zwei Termine angeboten (erste Woche nach Vorlesungsende im Sommersemester und eine Woche vor Vorlesungsbeginn im Wintersemester).

Literature
Alle Folien und Originalliteratur werden auf ILIAS zur Verfügung gestellt.

T 7.223 Course: Introduction to Sensory Analysis with Practice [T-CIWVT-111534]

Responsible: Prof. Dr. Katharina Scherf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each summer term	1

Events					
WT 23/24	6630		1 SWS	Lecture	Scherf, Stemler
ST 2024	6630	Einführung in die Sensorik mit Übungen	1 SWS	Lecture / 🗣	Stemler
Exams					
WT 23/24	7220016	Introduction to Sensory Analysis with Practice			Scherf
ST 2024	7220016	Introduction to Sensory Analysis with Practice			Scherf

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 7.224 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2024	2550470	Introduction to Stochastic Optimization	2 SWS	Lecture / 💻	Rebennack
ST 2024	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice / 🗣	Rebennack, Kandora
ST 2024	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	2 SWS	Others (sons	Rebennack, Kandora
Exams					
WT 23/24	7900242	Introduction to Stochastic Optimization			Rebennack
ST 2024	7900311	Introduction to Stochastic Optimization			Rebennack

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites
None.

T 7.225 Course: IoT Platform for Engineering [T-MACH-106743]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
WT 23/24	2123352	IoT platform for engineering	3 SWS	Project (P / 🗣	Ovtcharova, Maier
ST 2024	2123352	IoT platform for engineering	3 SWS	Project (P / 🗣	Meyer, Maier
Exams					
WT 23/24	76T-MACH-106743	IoT platform for engineering			Ovtcharova

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Assessment of another type (graded), Group teaching project on Industry 4.0 consisting of: Conception, implementation, accompanying documentation and final presentation.

Below you will find excerpts from events related to this course:

V IoT platform for engineering

2123352, WS 23/24, 3 SWS, Language: German, Open in study portal

Project (PRO)
On-Site

Content
Industry 4.0, IT systems for fabrication and assembly, process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- map and analyze processes in the context of Industry 4.0 with special methods of process modelling
- collaboratively grasp practical I4.0 issues using existing hardware and software and work out solutions for a continuous improvement process in a team
- prototypically implement the self-developed solution proposal with the given IT systems and the existing hardware equipment and finally present the results

Literature
Keine / None

V IoT platform for engineering

2123352, SS 2024, 3 SWS, Language: German, Open in study portal

Project (PRO)
On-Site

Content
Industry 4.0, IT systems for fabrication and assembly, process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- map and analyze processes in the context of Industry 4.0 with special methods of process modelling
- collaboratively grasp practical I4.0 issues using existing hardware and software and work out solutions for a continuous improvement process in a team
- prototypically implement the self-developed solution proposal with the given IT systems and the existing hardware equipment and finally present the results

Literature
Keine / None

T 7.226 Course: IT-Based Road Design [T-BGU-101804]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101066 - Safety, Computing and Law in Highway Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6233901	DV-gestützter Straßenentwurf	2 SWS	Lecture / Practice (/	Zimmermann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oram exam with 15 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.227 Course: IT-Fundamentals of Logistics [T-MACH-105187]

Responsible: Prof. Dr.-Ing. Frank Thomas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	4

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

T 7.228 Course: Joint Entrepreneurship Summer School [T-WIWI-109064]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Irregular	1

Events					
ST 2024	2500037	Joint Entrepreneurship School Egypt	4 SWS	Seminar / 🗣	Terzidis, Mohammadi
ST 2024	2545021	Joint Entrepreneurship School China	4 SWS	Seminar / 💻	Kleinn, Terzidis, Mohammadi
Exams					
ST 2024	7900346	Joint Entrepreneurship Summer School			Terzidis

Legend: 💻 Online, 🌍 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The learning control of the program (Summer School) consists of two parts:
A) **Investor Pitch**:
Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.

B) **Written elaboration:**
The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyzes and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.

The grade consists of 50% presentation performance and 50% written preparation.

Prerequisites
The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

Recommendation
We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

Annotation
The working language during the Summer School is English. A one-week stay in China is part of the Summer School.

Below you will find excerpts from events related to this course:

V Joint Entrepreneurship School Egypt

2500037, SS 2024, 4 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
During the Summer School in Egypt and Karlsruhe, students develop a business model of technologies and patents developed at KIT in workshops in German-Egypt tandems over the period of two weeks.

Organizational issues

- Briefing: April / May
- Karlsruhe: Presumably: 29/7 to 2/8 - 2024
- Cairo: Presumably: 1/9 -5/9 - 2024
- Deliverables: October 2024

V

Joint Entrepreneurship School China

2545021, SS 2024, 4 SWS, Language: English, Open in study portal

Seminar (S)
Online

Content
During the Summer School in Shanghai and Karlsruhe, students develop a business model of technologies and patents developed at KIT in workshops in German-Chinese tandems over the period of two weeks.

Click on our website for detailed information and a video: https://etm.entechnon.kit.edu/english/1095.php

Organizational issues
Dates:

- Briefing: April / May
- Karlsruhe: Presumably: August 05-09.2024
- Shanghai: Presumably: September 23-27.2024
- Deliverables: November 2024

T 7.229 Course: Judgement and Decision Making [T-WIWI-111099]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management
M-WIWI-105714 - Consumer Research
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4,5	Grade to a third	Each winter term	1 terms	2

Events					
WT 23/24	2500041	Exercise Judgment and Decision Making	2 SWS	Practice /	Seidler
WT 23/24	2540440	Judgment and Decision Making	3 SWS	Lecture /	Scheibehenne, Seidler
Exams					
WT 23/24	7900065	Judgement and Decision Making			Scheibehenne

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment. The grading includes the following aspects:

- a written exam (60 minutes)
- a presentation during the exercise.

The scoring system for the grading will be announced at the beginning of the course.

Prerequisites
Registration via the WIWI-Portal is required for participation in the Übung. The Übung is a prerequisite for the exam.

Annotation
The judgments and decisions that we make can have long ranging and important consequences for our (financial) well-being and individual health. Hence, the goal of this lecture is to gain a better understanding of how people make judgments and decisions and the factors that influences their behavior. We will look into simple heuristics and mental shortcuts that decision makers use to navigate their environment, in particular so in an economic context. Following this the lecture will provide an overview into social and emotional influences on decision making. In the second half of the semester we will look into some more specific topics including self-control, nudging, and food choice. The last part of the lecture will focus on risk communication and risk perception. We will address these questions from an interdisciplinary perspective at the intersection of Psychology, Behavioral Economics, Marketing, Cognitive Science, and Biology. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates.

The workload of the class is 4.5 ECTS. This consists of 3 ETCS for the lecture and 1.5 ETCS for the Übung. Details about the Übung will be communicated at the first day of the class.

Below you will find excerpts from events related to this course:

V Judgment and Decision Making

2540440, WS 23/24, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this lecture, students will be introduced to fundamental theories and key insights on human judgment and decision making. Topics include decision making under uncertainty, choice biases, simple heuristics, risk perception and -communication, as well as social and emotional influences on decision making, to name but a few. In the Wintersemester 20/21 this class will be held online. The lecture videos will be available for download and there will be regular online meetings to discuss the topics. The lecture will be held in English.

T 7.230 Course: KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics [T-WIWI-111109]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103118 - Data Science: Data-Driven User Modeling
M-WIWI-104080 - Designing Interactive Information Systems
M-WIWI-105714 - Consumer Research
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4,5	Grade to a third	Irregular	1 terms	1

Competence Certificate
Non exam assessment. Grading will be based on a continuous basis throughout the semester. The assessment consists of:

- A written paper, and
- a group presentation with subsequent discussion and question and answer session of 30 minutes.

For particularly active and constructive participation in the discussions of other papers during the final presentation, a bonus of one grade level (0.3 or 0.4) can be achieved on the passed exam. Details on the grading will be announced at the beginning of the event.

Annotation
The number of participants is limited due to laboratory capacity and to ensure optimal supervision of the project groups. Places are allocated on the basis of preferences and suitability for the topics. Previous knowledge in the field of experimental economic research is particularly important.

The course cannot be offered in the summer semester 2024.

T 7.231 Course: Knowledge Discovery [T-WIWI-102666]

Responsible: Dr.-Ing. Michael Färber
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2511303	Knowledge Discovery and Graph Representation Learning	3 SWS	Lecture / Practice (/ 🗣	Färber, Saier, Shao
Exams					
WT 23/24	79AIFB_KD_B3	Knowledge Discovery			Färber

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Instead of a final written exam, the record of achievement will be measured via project work, exercise assignments, and presentations. Specifically, the students will collaborate in groups of 3-4 to complete a comprehensive project which included a project proposal, mid-term report, and final report, cumulatively contributing 50% to their overall grade. Additionally, students will showcase their understanding of course material through the timely submission of three short assignments (totaling 25% of their grade). During the course, students will showcase their proficiency in public speaking and critical analysis by delivering engaging class presentations and discussions (25% of the grade).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Knowledge Discovery and Graph Representation Learning

2511303, WS 23/24, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture provides a comprehensive overview of various approaches in machine learning and data mining for knowledge extraction. It explores multiple fields, including machine learning, natural language processing, and knowledge representation. The main focus is on discovering patterns and regularities in extensive data sets, particularly unstructured text found in news articles, publications, and social media. This process is known as knowledge discovery. The lecture delves into specific techniques, methods, challenges, as well as current and future research topics within this field.
One part of the lecture is dedicated to understanding large language models (LLMs), such as ChatGPT, by exploring their underlying principles, training methods, and applications. Additionally, the lecture dives into graph representation learning, which involves extracting meaningful representations from graph data. It covers the mathematical foundations of graph and geometric deep learning, highlighting the latest applications in areas like explainable recommender systems.
Moreover, the lecture highlights the integration of knowledge graphs with large language models, known as neurosymbolic AI. This integration aims to combine structured and unstructured data to enhance knowledge extraction and representation.
The content of the lecture encompasses the entire machine learning and data mining process. It covers topics on supervised and unsupervised learning techniques, as well as empirical evaluation. Various learning methods are explored, ranging from classical approaches like decision trees, support vector machines, and neural networks to more recent advancements such as graph neural networks.

Learning obectives:

Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

T 7.232 Course: Laboratory Laser Materials Processing [T-MACH-102154]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each term	2

Events					
WT 23/24	2183640	Laboratory "Laser Materials Processing"	3 SWS	Practical course / 🧩	Schneider, Pfleging
ST 2024	2183640	Laboratory "Laser Materials Processing"	3 SWS	Practical course / 🧩	Schneider, Pfleging
Exams					
WT 23/24	76-T-MACH-102154	Laboratory Laser Materials Processing			Schneider
ST 2024	76-T-MACH-102154	Laboratory Laser Materials Processing			Schneider

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

Prerequisites
None

Recommendation
Basic knowledge of physics, chemistry and material science is assumed.

Below you will find excerpts from events related to this course:

V Laboratory "Laser Materials Processing"

2183640, WS 23/24, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The laboratory compromises 8 half-day experiments, which address the following laser processing topics of metals, ceramics and polymers:

• safety aspects

• surface hardening and remelting

• melt and reactive cutting

• surface modification by dispersing or alloying

• welding

• surface texturing

• metrology

There are used CO2-, excimer-, Nd:YAG- and high power diode-laser sources within the laboratory.

The student

- can describe the influence of laser, material and process parameters and can choose suitable parameters for the most important methods of laser-based processing in automotive engineering.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

The attendance to one of the courses Physical Basics of Laser Technology (2181612) or Laser Application in Automotive Engineering (2182642) is strongly recommended.

regular attendance: 34 hours
self-study: 86 hours

The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

Organizational issues
Maximal 12 Teilnehmer/innen!
Aktuell sind alle Plätze vergeben! Registrierung für die Nachrückliste möglich per Email an johannes.schneider@kit.edu
Praktikum findet in Kleingruppen semesterbegleitend (dienstags bzw. mittwochs, halbtägig) auf dem Campus Nord am IAM-AWP (Geb. 681) und auf dem Campus Süd am IAM-CMS (Geb. 30.48) statt!

Termine werden mit den Teilnehmern/innen direkt abgestimmt.

Literature
F. K. Kneubühl, M. W. Sigrist: Laser, 2008, Vieweg+Teubner

T. Graf: Laser - Grundlagen der Laserstrahlquellen, 2009, Vieweg-Teubner Verlag

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

H. Hügel, T. Graf: Laser in der Fertigung, 2009, Vieweg+Teubner

J. Eichler, H.-J. Eichler: Laser - Bauformen, Strahlführung, Anwendungen, 2006, Springer

V **Laboratory "Laser Materials Processing"** **Practical course (P)**
2183640, SS 2024, 3 SWS, Language: German, Open in study portal **Blended (On-Site/Online)**

Content
The laboratory compromises 8 half-day experiments, which address the following laser processing topics of metals, ceramics and polymers:

- safety aspects
- surface hardening and remelting
- melt and reactive cutting
- surface modification by dispersing or alloying
- welding
- surface texturing
- metrology

There are used CO2-, excimer-, Nd:YAG- and high power diode-laser sources within the laboratory.

The student

- can describe the influence of laser, material and process parameters and can choose suitable parameters for the most important methods of laser-based processing in automotive engineering.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

The attendance to one of the courses Physical Basics of Laser Technology (2181612) or Laser Application in Automotive Engineering (2182642) is strongly recommended.

regular attendance: 34 hours
self-study: 86 hours

The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

Organizational issues
Die Praktikumsplätze für das Sommersemester 2024 sind bereits ausgebucht!

Anmeldung per Email an johannes.schneider@kit.edu

Das Praktikum findet semesterbegleitend in Kleingruppen am IAM-ZM (CS) bzw. IAM-AWP (CN) statt!

Die Termine werden zu Beginn des Semesters bekannt gegeben.

Literature
F. K. Kneubühl, M. W. Sigrist: Laser, 2008, Vieweg+Teubner

T. Graf: Laser - Grundlagen der Laserstrahlquellen, 2009, Vieweg-Teubner Verlag

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

H. Hügel, T. Graf: Laser in der Fertigung, 2009, Vieweg+Teubner

J. Eichler, H.-J. Eichler: Laser - Bauformen, Strahlführung, Anwendungen, 2006, Springer

W.T. Silfvast: Laser Fundamentals, 2008, Cambrigde University Press

W.M. Steen: Laser Materials Processing, 2010, Springer

T 7.233 Course: Laboratory Production Metrology [T-MACH-108878]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Dr. Florian Stamer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each summer term	2

Events					
ST 2024	2150550	Laboratory Production Metrology	3 SWS	Practical course / 🗣	Lanza, Stamer
Exams					
ST 2024	76-T-MACH-108878	Laboratory Production Metrology			Lanza, Stamer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative Test Achievement: Group presentation of 15 min at the beginning of each experiment and evaluation of the participation during the experiments

and

Oral Exam (15 min)

Prerequisites
none

Annotation
For organizational reasons the number of participants for the course is limited. Hence al selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

Below you will find excerpts from events related to this course:

V **Laboratory Production Metrology** — **Practical course (P) On-Site**
2150550, SS 2024, 3 SWS, Language: German, Open in study portal

Content
During this course, students get to know measurement systems that are used in a production system. In the age of Industry 4.0, sensors are becoming more important. Therefore, the application of in-line measurement technology such as machine vision and non-destructive testing is focussed. Additionally, laboratory based measurement technologies such as computed tomography are addressed. The students learn the theoretical background as well as practical applications for industrial examples. The students use sensors by themselves during the course. Additionally, they are trained on how to integrate sensors in production processes and how to analyze measurement data with suitable software.

The following topics are addressed:

- Classification and examples for different measurement technologies in a production environment
- Machine vision with optical sensors
- Information fusion based on optical measurements
- Robot-based optical measurements
- Non-destructive testing by means of acoustic measurements
- Coodinate measurement technology
- Industrial computed tomography
- Measurement uncertainty evaluation
- Analysis of production data by means of data mining

Learning Outcomes:

The students …

- are able to name, describe and mark out different measurement technologies that are relevant in a production environment.
- are able to conduct measurements with the presented in-line and laboratory based measurement systems.
- are able to analyze measurement results and asses the measurement uncertainty of these.
- are able to deduce whether a work piece fulfills quality relevant specifications by analysing measurement results.
- are able to use the presented measurement technologies for a new task.

Workload:

regular attendance: 31,5 hours
self-study: 88,5 hours

Organizational issues
Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

For organizational reasons the number of participants for the course is limited. Hence a selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

Literature
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt. Ebenso wird auf gängie Fachliteratur verwiesen.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/). Additional reference to literature will be provided, as well.

T 7.234 Course: Large Diesel and Gas Engines for Ship Propulsions [T-MACH-110816]

Responsible: Dr.-Ing. Heiko Kubach
Organisation:
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	4	Grade to a third	Each summer term	1 terms	1

Events					
ST 2024	2134154	Large Diesel and Gas Engines for Ship Propulsions	2 SWS	Lecture / 🗣	Weisser

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, 20 minutes

Prerequisites
None

Below you will find excerpts from events related to this course:

V Large Diesel and Gas Engines for Ship Propulsions

2134154, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Introduction and History
- Types of Ships amd Propulsion Systems
- Thermodynamic
- Boosting
- Design
- Fuels
- Lubricants
- Injection of liquid Fuels
- Combustions Processes for liquid Fuels
- Injection of Gaseous Fuels
- Combustion Processes for Gaseous Fuels
- Emissions
- Integration of Engines in Ships
- Large Engines in other Applications

Organizational issues
ACHTUNG: abweichend von den hier aufgeführten regelmäßigen Mittwoch-Terminen muss die Vorlesung als Blockveranstaltung in KW 29 durchgeführt werden. Genaue Informationen entnehmen Sie bitte dem entsprechenden Iliaskurs.

T 7.235 Course: Large-scale Optimization [T-WIWI-106549]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2024	2550475	Large-Scale Optimization	2 SWS	Lecture /	Rebennack
ST 2024	2550476	Übung zu Large-Scale Optimization	1 SWS	Practice /	Bijiga, Rebennack
ST 2024	2550477	Rechnerübung zu Large-scale Optimization	2 SWS	Others (sons	Rebennack, Bijiga
Exams					
WT 23/24	7900244	Large-scale Optimization			Rebennack
ST 2024	7900291	Large-scale Optimization			Rebennack

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

Prerequisites
None.

T 7.236 Course: Laser in Automotive Engineering [T-MACH-105164]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
ST 2024	2182642	Laser Material Processing	2 SWS	Lecture / 🗣	Schneider
Exams					
WT 23/24	76-T-MACH-105164	Laser in Automotive Engineering			Schneider
ST 2024	76-T-MACH-105164	Laser in Automotive Engineering / Laser Material Processing			Schneider

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with brick Laser Material Processing [T-MACH-112763], brick Physical Basics of Laser Technology [T-MACH-109084] and brick Physical Basics of Laser Technology [T-MACH-102102]

Recommendation
preliminary knowlegde in mathematics, physics and materials science

Below you will find excerpts from events related to this course:

V Laser Material Processing

2182642, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Based on a short description of the physical basics of laser technology the lecture reviews the most important high power lasers and their various applications in automotive engineering. Furthermore the application of laser light in metrology and safety aspects will be addressed.

- physical basics of laser technology
- laser beam sources (Nd:YAG-, CO2-, high power diode-laser)
- beam properties, guiding and shaping
- basics of materials processing with lasers
- laser applications in material processing
- savety aspects

The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of Nd:YAG-, CO2- and high power diode-laser sources.
- can describe the most important methods of laser-based processing in automotive engineering and illustrate the influence of laser, material and process parameters
- can analyse manufacturing problems and is able to choose a suitable laser source and process parameters.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

It is not possible, to combine this lecture with the lecture *Physical basics of laser technology* [2181612].

regular attendance: 22,5 hours
self-study: 97,5 hours

oral examination (ca. 30 min)

no tools or reference materials

Organizational issues
Die Vorlesung ersetzt die bisherige Vorlesung "Lasereinsatz im Automobilbau" und wird jetzt auf Englisch angeboten!

The lecture replaces the previous lecture "Laser Application in Automotive Engineering" and is now offered in English!

Literature
W. T. Silvast: Laser Fundamentals, 2004, Cambridge University Press

J. Eichler, H.-J. Eichler: Laser - Basics, Advances, Applications, 2018, Springer

P. Poprawe: Tailored Light 1, 2018, Springer

K. F. Renk: Basics of Laser Physics, 2017, Springer

M. W. Sigrist: Laser: Theorie, Typen und Anwendungen, 2018, Springer-Spektrum

H. Hügel, T. Graf: Materialbearbeitung mit Laser, 2022, Springer Vieweg

T. Graf: Laser - Grundlagen der Laserstrahlquellen, 2009, Vieweg-Teubner Verlag

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

T 7.237 Course: Laser Material Processing [T-MACH-112763]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2182642	Laser Material Processing	2 SWS	Lecture / 🗣	Schneider
Exams					
WT 23/24	76-T-MACH-112763	Laser Material Processing			Schneider
ST 2024	76-T-MACH-112763	Laser Material Processing			Schneider

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with Laser in Automotive Engineering [T-MACH-105164], brick Physical Basics of Laser Technology [T-MACH-109084] and brick Physical Basics of Laser Technology [T-MACH-102102].

Recommendation
preliminary knowlegde in mathematics, physics and materials science

Below you will find excerpts from events related to this course:

V Laser Material Processing

2182642, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Based on a short description of the physical basics of laser technology the lecture reviews the most important high power lasers and their various applications in automotive engineering. Furthermore the application of laser light in metrology and safety aspects will be addressed.

- physical basics of laser technology
- laser beam sources (Nd:YAG-, CO2-, high power diode-laser)
- beam properties, guiding and shaping
- basics of materials processing with lasers
- laser applications in material processing
- savety aspects

The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of Nd:YAG-, CO2- and high power diode-laser sources.
- can describe the most important methods of laser-based processing in automotive engineering and illustrate the influence of laser, material and process parameters
- can analyse manufacturing problems and is able to choose a suitable laser source and process parameters.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

It is not possible, to combine this lecture with the lecture *Physical basics of laser technology* [2181612].

regular attendance: 22,5 hours
self-study: 97,5 hours

oral examination (ca. 30 min)

no tools or reference materials

Organizational issues
Die Vorlesung ersetzt die bisherige Vorlesung "Lasereinsatz im Automobilbau" und wird jetzt auf Englisch angeboten!

The lecture replaces the previous lecture "Laser Application in Automotive Engineering" and is now offered in English!

Literature
W. T. Silvast: Laser Fundamentals, 2004, Cambridge University Press

J. Eichler, H.-J. Eichler: Laser - Basics, Advances, Applications, 2018, Springer

P. Poprawe: Tailored Light 1, 2018, Springer

K. F. Renk: Basics of Laser Physics, 2017, Springer

M. W. Sigrist: Laser: Theorie, Typen und Anwendungen, 2018, Springer-Spektrum

H. Hügel, T. Graf: Materialbearbeitung mit Laser, 2022, Springer Vieweg

T. Graf: Laser - Grundlagen der Laserstrahlquellen, 2009, Vieweg-Teubner Verlag

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

T 7.238 Course: Laser Physics [T-ETIT-100741]

Responsible: Prof. Dr. Marc Eichhorn
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Microoptics
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2301480	Laserphysics	2 SWS	Lecture /	Eichhorn
WT 23/24	2301481	Exercise for 2301480 Laserphysics	1 SWS	Practice /	Eichhorn
Exams					
WT 23/24	737300030	Laser Physics			Eichhorn
ST 2024	7300023	Laser Physics			Eichhorn

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The exam will be taken as an oral examination (about 20 minutes). The individual appointments for examination are offered at two previously determined dates.

Prerequisites
none

T 7.239 Course: Laws concerning Traffic and Roads [T-BGU-106615]

Responsible: Hon.-Prof. Dr. Dietmar Hönig
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101066 - Safety, Computing and Law in Highway Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6233803	Verkehrs-, Planungs- und Wegerecht	2 SWS	Lecture / 🗣	Hönig

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
None

Recommendation
None

Annotation
None

T 7.240 Course: Lean Construction [T-BGU-108000]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Events					
WT 23/24	6241901	Lean Construction	4 SWS	Lecture / Practice (/ 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 23/24	8246108000	Lean Construction			Haghsheno

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 70 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.241 Course: Learning Factory “Global Production“ [T-MACH-105783]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each winter term	4

Events					
WT 23/24	2149612	Learning Factory “Global Production“	4 SWS	/	Lanza
Exams					
WT 23/24	76-T-MACH-105783	Learning Factory "Global Production"			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative test achievement (graded):

- Knowledge acquisition in the context of the seminar (4 achievements 20 min each) with weighting 40%.
- Interaction between participants with weighting 15%.
- Scientific colloquium (in groups of 3 students approx. 45 min each) with weighting 45%.

Prerequisites
none

Annotation
For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/lernfabrik.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Below you will find excerpts from events related to this course:

V Learning Factory “Global Production“

2149612, WS 23/24, 4 SWS, Language: German, Open in study portal **Blended (On-Site/Online)**

Content
The learning factory “Global Production“ serves as a modern teaching environment for the challenges of global production. To make this challenges come alive, students can run a production of electric motors under real production conditions.
The course is divided into e-learning units and presence dates. The e-learning units help to learn essential basics and to immerse themselves in specific topics (e.g. selection of location, supplier selection and planning of production networks). The focus of the presence appointments is the case-specific application of relevant methods for planning and control of production systems that are suitable for the location. In addition to traditional methods and tools to organize lean production systems (e.g. Kanban and JIT/ JIS, Line Balancing) the lecture in particular deals with site-specific quality assurance and scalable automation. Essential methods for quality assurance in complex production systems are taught and brought to practical experience by a Six Sigma project. In the area of scalable automation, it is important to find solutions for the adaption of the level of automation of the production system to the local production conditions (e.g. automated workpiece transport, integration of lightweight robots for process linking) and to implement them physically. At the same time safety concepts should be developed and implemented as enablers for human-robot collaboration.
The course also includes an excursion to the production plant for the manufacturing of electric motors of an industrial partner.

Main focus of the lecture:

- site selection
- site-specific factory planning
- site-specific quality assurance
- scalable automation
- supplier selection

Learning Outcomes:

The students are able to …

- evaluate and select alternative locations using appropriate methods.
- use methods and tools of lean management to plan and manage production systems that are suitable for the location.
- use the Six Sigma method and apply goal-oriented process management.
- select an appropriate level of automation of the production units based on quantitative variables.
- make use of well-established methods for the evaluation and selection of suppliers.
- apply methods for planning a global production network depending on company-specific circumstances to sketch a suitable network and classify and evaluating it according to specific criteria.
- apply the learned methods and approaches with regard to problem solving in a global production environment and able to reflect their effectiveness.

Workload:

e-Learning: ~ 24 h
regular attendence: ~ 36 h
self-study: ~ 60 h

Organizational issues
Termine werden über die Institutshomepage bekanntgegeben.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Teilnehmer begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php)

Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.

Die Studierenden sollten Vorkenntnisse in mindestens einem der folgenden Bereiche haben:

- Integrierte Produktionsplanung
- Globale Produktion und Logistik
- Qualitätsmanagement

For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/studium-und-lehre.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Literature
Medien:
E-Learning Plattform ilias, Powerpoint, Fotoprotokoll. Die Medien werden über ilias (https://ilias.studium.kit.edu/) bereitgestellt.
Media:
E-learning platform ilias, powerpoint, photo protocol. The media are provided through ilias (https://ilias.studium.kit.edu/).

T 7.242 Course: Liberalised Power Markets [T-WIWI-107043]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2581998	Liberalised Power Markets	2 SWS	Lecture / 🗣	Fichtner
WT 23/24	2581999	Übungen zu Liberalised Power Markets	2 SWS	Practice / 🗣	Signer, Fichtner, Beranek
Exams					
WT 23/24	7900160	Liberalised Power Markets NEW			Fichtner
WT 23/24	7900193	Liberalised Power Markets			Fichtner
ST 2024	7900205	Liberalised Power Markets NEW			Fichtner
ST 2024	7900253	Liberalised Power Markets			Fichtner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Recommendation
None

Below you will find excerpts from events related to this course:

V **Liberalised Power Markets** — **Lecture (V) On-Site**
2581998, WS 23/24, 2 SWS, Language: English, Open in study portal

Content

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.1. Unbundling Dimensions of liberalised power markets
2.2. Central dispatch versus markets without central dispatch
2.3. The short-term market model
2.4. The long-term market model
2.5. Market flaws and market failure
2.6. Regulation in liberalised markets

3. The power (sub)markets

3.1 Day-ahead market
3.2 Intraday market
3.3 (Long-term) Forwards and futures markets
3.4 Emission rights market
3.5 Market for ancillary services
3.6 The “market” for renewable energies
3.7 Future market segments

4. Grid operation and congestion management

4.1. Grid operation
4.2. Congestion management

5. Market power

5.1. Defining market power
5.2. Indicators of market power
5.3. Reducing market power

6. Future market structures in the electricity value chain

1. Power markets in the past, now and in future

2. Designing liberalised power markets

2.2. Unbundling Dimensions of liberalised power markets
2.3. Central dispatch versus markets without central dispatch
2.4. The short-term market model
2.5. The long-term market model
2.6. Market flaws and market failure
2.7. Regulation in liberalised markets

3. The power (sub)markets

3.1 Day-ahead market
3.2 Intraday market
3.3 (Long-term) Forwards and futures markets
3.4 Emission rights market
3.5 Market for ancillary services
3.6 The “market” for renewable energies
3.7 Future market segments

4. Grid operation and congestion management

4.1. Grid operation
4.2. Congestion management

5. Market power

5.1. Defining market power
5.2. Indicators of market power
5.3. Reducing market power

6. Future market structures in the electricity value chain

Literature
Weiterführende Literatur:

Power System Economics; Steven Stoft, IEEE Press/Wiley-Interscience Press, 0-471-15040-1

T 7.243 Course: Life Cycle Assessment – Basics and Application Possibilities in an Industrial Context [T-WIWI-113107]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2581995	Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context	2 SWS	Lecture / 🗣	Steffl, Treml
Exams					
WT 23/24	7981995	Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context			Schultmann
ST 2024	7981995	Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context			Schultmann

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None.

Recommendation
None

Below you will find excerpts from events related to this course:

V Life Cycle Assessment - Basics and Application Possibilities in an Industrial Context

Lecture (V) On-Site

2581995, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
The lecture focuses on the analysis of the environmental impacts of products and processes using Life Cycle Assessment (short: LCA). Structure and steps are conveyed in detail and selected further developments are shown. In order to record the methodology and classify potential environmental impacts, the practical development of what has been learned is also focused on using LCA software and interactive formats.

Topics include:

- Significance and areas of application
- Calculation models
- Attributional/Consequential LCA
- Life Cycle Sustainability Assessment, Social LCA and Life Cycle Costing
- Limitations
- Development of a Case Study

Literature
werden in der Veranstaltung bekannt gegeben

T 7.244 Course: Logistics and Supply Chain Management [T-MACH-110771]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105298 - Logistics and Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	9	Grade to a third	Each summer term	4

Events					
ST 2024	2118078	Logistics and Supply Chain Management	4 SWS	Lecture / 🗣	Furmans, Alicke
Exams					
ST 2024	76-T-MACH-110771	Logistics and Supply Chain Management			Furmans

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The success control takes place in the form of an examination performance of a different kind. This is composed as follows:

- 50% assessment of a written examination (60 min) during the semester break
- 50% assessment of an oral examination (20 min) during the semester break

To pass the examination, both examination performances must be passed.

Prerequisites
None

Annotation
The brick cannot be taken if one of the bricks "T-MACH-102089 – Logistics - Organisation, Design and Control of Logistic Systems" and "T-MACH-105181 – Supply Chain Management" has been taken.

Below you will find excerpts from events related to this course:

V Logistics and Supply Chain Management

2118078, SS 2024, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
In the lecture "Logistics and Supply Chain Management", comprehensive and well-founded fundamentals of crucial issues in logistics and supply chain management are presented. Furthermore, the interaction of different design elements of supply chains is emphasized. For this purpose, both qualitative and quantitative models are presented and applied. Additionally, methods for mapping and evaluating logistics systems and supply chains are described. The contents of the lecture are deepened in exercises and case studies and comprehension is partially reviewed in case studies. The contents will be illustrated, among other things, on the basis of supply chains in the automotive industry.

Among others, the following topics are covered:

- Inventory Management
- Forecasting
- Bullwhip Effect
- Supply Chain Segmentation and Collaboration
- Key Performance Indicators
- Supply Chain Risk Management
- Production Logistics
- Location Planning
- Route Planning

It is intended to provide an interactive format in which students can also contribute (and work alone or in groups). Since logistics and supply chain management (also in times during and after Corona) requires working in an international environment and therefore many terms are derived from English, the lecture will be held in English.

T 7.245 Course: Long-Distance and Air Traffic [T-BGU-106301]

Responsible: Dr.-Ing. Bastian Chlond
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 23/24	6232904	Fern- und Luftverkehr	2 SWS	Lecture /	Chlond, Dozenten
Exams					
WT 23/24	8245106301	Long-distance and Air Traffic			Chlond

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.246 Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 23/24	2511500	Machine Learning 1 - Fundamental Methods	2 SWS	Lecture / 🗣	Zöllner
WT 23/24	2511501	Exercises to Machine Learning 1 - Fundamental Methods	1 SWS	Practice / 🗣	Zöllner, Polley, Fechner, Daaboul
Exams					
WT 23/24	79AIFB_ML1_C5	Machine Learning 1 - Basic Methods			Zöllner
ST 2024	79AIFB_ML1_C4	Machine Learning 1 - Basic Methods (Registration until 15 July 2024)			Zöllner

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the exam will be offered either as an open-book exam, or as a written exam (60 min):

The exam takes place every semester and can be repeated at every regular examination date.

A grade bonus can be earned by successfully completing practice exercises. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Machine Learning 1 - Fundamental Methods

2511500, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The course prepares students for the rapidly evolving field of machine learning by providing a solid foundation, covering core concepts and techniques to get started in the field. Students delve into different methods in supervised, unsupervised, and reinforcement learning, as well as various model types, ranging from basic linear classifiers to more complex methods, such as deep neural networks. Topics include general learning theory, support vector machines, decision trees, neural network fundamentals, convolutional neural networks, recurrent neural networks, unsupervised learning, reinforcement learning, and Bayesian learning.

The course is accompanied by a corresponding exercise, where students gain hands-on experience by implementing and experimenting with different machine learning algorithms, helping them to apply machine learning algorithms on real world problems.

By the end of the course, students will have acquired a solid foundation in machine learning, enabling them to apply state-of-the-art algorithms to solve complex problems, contribute to research efforts, and explore advanced topics in the field.

Learning obectives:

- Students acquire knowledge of the fundamental methods in the field of machine learning.
- Students can classify, formally describe and evaluate methods of machine learning.
- Students can use their knowledge to select suitable models and methods for selected problems in the field of of machine learning.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Machine Learning - Tom Mitchell
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 7.247 Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics
M-WIWI-101637 - Analytics and Statistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	4

Events					
ST 2024	2511502	Machine Learning 2 - Advanced methods	2 SWS	Lecture / 🗣	Zöllner, Fechner, Polley
ST 2024	2511503	Exercises for Machine Learning 2 - Advanced Methods	1 SWS	Practice / 🗣	Zöllner, Fechner, Polley
Exams					
WT 23/24	79AIFB_ML2_B8	Machine Learning 2 – Advanced Methods			Zöllner
ST 2024	79AIFB_ML2_B1	Machine Learning 2 – Advanced Methods (Registration until 15 July 2024)			Zöllner

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the exam will be offered either as an open-book exam, or as a written exam (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Machine Learning 2 - Advanced methods

2511502, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 2" deals with modern advanced methods of machine learning such as semi-supervised, self-supervised and active learning, deep neural networks (deep learning, CNNs, GANs, diffusion models, transformer, adversarial attacks) and hierarchical approaches, e.g. reinforcement learning. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (vehicles, robotics, neurorobotics, image processing, etc.).

Learning objectives:

- Students understand extended concepts of machine learning and their possible applications.
- Students can classify, formally describe and evaluate methods of machine learning.
- In detail, methods of machine learning can be embedded and applied in complex decision and inference systems.
- Students can use their knowledge to select suitable models and methods of machine learning for existing problems in the field of machine intelligence.

Recommendations:

Attending the lecture ***Machine Learning 1*** or a comparable lecture is very helpful in understanding this lecture.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Deep Learning - Ian Goodfellow
- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.

T 7.248 Course: Machine Learning and Optimization in Energy Systems [T-WIWI-113073]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2581050	Machine Learning and Optimization in Energy Systems	3 SWS	Lecture / Practice (/	Dengiz, Yilmaz, Perau
Exams					
WT 23/24	7900179	Machine Learning and Optimization in Energy Systems			Fichtner
ST 2024	7900207	Machine Learning and Optimization in Energy Systems			Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) or an oral exam (30 min) depending on the number of participants.

Below you will find excerpts from events related to this course:

V Machine Learning and Optimization in Energy Systems

2581050, WS 23/24, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Goals:
Participants should know about the most common optimization and machine learning approaches for the application in energy systems. They should understand the basic principles of the methods and should be able to apply them for solving important problems of future energy systems with high shares of renewable energy sources.

Content:
In the beginning, the essential transition of the energy system into a smart grid and the need for methods from the field of optimization and machine learning are explained. The course can be subdivided into an optimization part and a larger machine learning part. In the optimization part, the basics of optimization approaches that are used in energy systems are shown. Further, heuristic methods and approaches from the field of multiobjective optimization are introduced. In the machine learning part, the most important methods from the field of unsupervised learning, supervised learning and reinforcement learning are introduced and their application in future energy systems are investigated.

Amongst the considered applications are power plant dispatch, intelligent heating with heat pumps, charging strategies for electric vehicles, clustering of energy data for energy system models and electricity demand and renewable generation forecasting.

We also offer a voluntary computer exercise that deepens the understanding of the methods and applications covered in the lecture. The students will have the opportunity to solve problems from the energy domain by using optimization and machine learning approaches implemented in the programming language Python.

The course's general focus is on the application of the methods in the energy field and not on the mathematical details of the different approaches.

The total workload for this course is approximately 105 hours:

- Attendance: 30 hours
- Self-study: 30 hours
- Exam preparation: 45 hours

T 7.249 Course: Machine Tools and High-Precision Manufacturing Systems [T-MACH-110963]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101286 - Machine Tools and Industrial Handling

Type	Credits	Grading scale	Recurrence	Version
Oral examination	9	Grade to a third	Each winter term	2

Events					
WT 23/24	2149910	Machine Tools and High-Precision Manufacturing Systems	6 SWS	Lecture / Practice (/ 🗣	Fleischer
Exams					
WT 23/24	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer
ST 2024	76-T-MACH-110963-WING	Machine Tools and High-Precision Manufacturing Systems			Fleischer

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam (approx. 45 minutes)

Prerequisites
T-MACH-102158 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-109055 - Machine Tools and Industrial Handling must not be commenced.
T-MACH-110962 - Machine Tools and High-Precision Manufacturing Systems must not be commenced.

Below you will find excerpts from events related to this course:

V Machine Tools and High-Precision Manufacturing Systems

2149910, WS 23/24, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture gives an overview of the construction, use and application of machine tools and high-precision manufacturing systems. In the course of the lecture a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools and high-precision manufacturing systems is conveyed. First, the main components of the systems are systematically explained and their design principles as well as the integral system design are discussed. Subsequently, the use and application of machine tools and high-precision manufacturing systems will be demonstrated using typical machine examples. Based on examples from current research and industrial applications, the latest developments are discussed, especially concerning the implementation of Industry 4.0 and artificial intelligence.
Guest lectures from industry round off the lecture with insights into practice.

The individual topics are:

- Structural components of dynamic manufacturing Systems
- Feed axes: High-precision positioning
- Spindles of cutting machine Tools
- Peripheral Equipment
- Machine control unit
- Metrological Evaluation
- Maintenance strategies and condition Monitoring
- Process Monitoring
- Development process for machine tools and high-precision manufacturing Systems
- Machine examples

Learning Outcomes:

The students …

- are able to assess the use and application of machine tools and high-precision manufacturing systems and to differentiate between them in terms of their characteristics and design.
- can describe and discuss the essential elements of machine tools and high-precision manufacturing systems (frame, main spindle, feed axes, peripheral equipment, control unit).
- are able to select and dimension the essential components of machine tools and high-precision manufacturing systems.
- are capable of selecting and evaluating machine tools and high-precision manufacturing systems according to technical and economic criteria.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING/TVWL:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine montags und mittwochs, Übungstermine donnerstags.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Lectures on Mondays and Wednesdays, tutorial on Thursdays.
The tutorial dates will announced in the first lecture.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.250 Course: Management Accounting 1 [T-WIWI-102800]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2579900	Management Accounting 1	2 SWS	Lecture / 🖳	Wouters
ST 2024	2579901	Tutorial Management Accounting 1 (Bachelor)	2 SWS	Practice / 🗣	Dickemann
ST 2024	2579902	Tutorial Management Accounting 1 (Master)	2 SWS	Practice / 🗣	Dickemann
Exams					
WT 23/24	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
WT 23/24	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters
ST 2024	79-2579900-B	Management Accounting 1 (Bachelor)			Wouters
ST 2024	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)			Wouters

Legend: 🖳 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (120 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Recommendation
We recommend that you take part in our exercise for the lecture.

Annotation
The exercise is offered separately for Bachelor's students as well as for students in the Master's transfer and Master's program.

Note for exam registration:

- Bachelor students: 79-2579900-B Management Accounting 1 (Bachelor)
- Students in the Master's transfer and Master's program: 79-2579900-M Management Accounting 1 (Master's transfer and Master)

Below you will find excerpts from events related to this course:

V Management Accounting 1

2579900, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics.
- They can use financial information for various purposes in organizations.

Examination:

- The assessment consists of a written exam (120 minutes) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Publisher: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- In addition, several papers that will be available on ILIAS.

V **Tutorial Management Accounting 1 (Bachelor)** **Practice (Ü) On-Site**
2579901, SS 2024, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

V **Tutorial Management Accounting 1 (Master)** **Practice (Ü) On-Site**
2579902, SS 2024, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

T 7.251 Course: Management Accounting 2 [T-WIWI-102801]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2579903	Management Accounting 2	2 SWS	Lecture / 🖥	Wouters
WT 23/24	2579904	Tutorial Management Accounting 2 (Bachelor)	2 SWS	Practice / 🗣	Letmathe
WT 23/24	2579905	Tutorial Management Accounting 2 (Master)	2 SWS	Practice / 🗣	Letmathe
Exams					
WT 23/24	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
WT 23/24	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters
ST 2024	79-2579903-B	Management Accounting 2 (Bachelor)			Wouters
ST 2024	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)			Wouters

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (120 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
It is recommended:

- to take part in the course "Management Accounting1" before this course
- participation in the exercise for the lecture "Management Accounting 2"

Annotation
The exercise for the lecture is offered separately for Bachelor's students as well as for students in the Master's transfer and Master's program.

Note for exam registration: Bachelor students:

- 79-2579903-B Management Accounting 2 (Bachelor)
- Students in the Master's transfer and Master's program: 79-2579903-M Management Accounting 2 (Master's transfer and Master)

Below you will find excerpts from events related to this course:

V **Management Accounting 2** — **Lecture (V) Online**
2579903, WS 23/24, 2 SWS, Language: English, Open in study portal

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:

- Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Recommendations:

- It is recommended to take part in the course "Management Accounting 1" before this course.

Examination:

- The assessment consists of a written exam (120 min) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

Workload:

- The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Marc Wouters, Frank H. Selto, Ronald W. Hilton, Michael W. Maher: Cost Management – Strategies for Business Decisions, 2012, Verlag: McGraw-Hill Higher Education (ISBN-13 9780077132392 / ISBN-10 0077132394)
- Zusätzlich werden Artikel auf ILIAS zur Vergügung gestellt.

V **Tutorial Management Accounting 2 (Bachelor)** — **Practice (Ü) On-Site**
2579904, WS 23/24, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

V **Tutorial Management Accounting 2 (Master)** — **Practice (Ü) On-Site**
2579905, WS 23/24, 2 SWS, Language: English, Open in study portal

Content
see ILIAS

T 7.252 Course: Management of IT-Projects [T-WIWI-112599]

Responsible: Dr. Roland Schätzle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2511214	Management of IT-Projects	2 SWS	Lecture / 🗣	Schätzle
ST 2024	2511215	Übungen zu Management von IT-Projekten	1 SWS	Practice / 🗣	Schätzle
Exams					
WT 23/24	79AIFB_MvIP_C3	Management of IT-Projects			Oberweis
ST 2024	79AIFB_MvIP_A1	Management of IT-Projects (Registration until 15 July 2024)			Oberweis

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment takes place in the form of a written examination (exam) in the amount of 60 minutes. The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
Prerequisite for the participation in the examination is the successful participation in the exercise, which takes place in the summer semester, starting from summer semester 2020. The number of participants in the exercise is limited.

Below you will find excerpts from events related to this course:

V Management of IT-Projects

2511214, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Learning objectives:

Students

- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropiate to current project phases and project contexts,
- consider organisational and social impact factors.

Recommendations:

Knowledge from the lecture Software Engineering is helpful.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004
- Project Management Institute Standards Committee. A Guide to the Project Management Body of Knowledge (PMBoK guide). Project Management Institute. Four Campus Boulevard. Newton Square. PA 190733299. U.S.A.

V

Übungen zu Management von IT-Projekten

2511215, SS 2024, 1 SWS, Language: German, Open in study portal

Practice (Ü)
On-Site

Content
The general conditions, influencing factors and methods in the planning, execution and control of IT projects are dealt with. In particular, the following topics will be dealt with: Project environment, project organization, project structure plan, effort estimation, project infrastructure, project control, decision-making processes, negotiation, time management. The lecture is accompanied by exercises in the form of tutorials. The date of the exercise will be announced later.

T 7.253 Course: Managing New Technologies [T-WIWI-102612]

Responsible: Dr. Thomas Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	see Annotations	2

Events					
ST 2024	2545003	Managing New Technologies	2 SWS	Lecture / 🗣	Reiß
Exams					
WT 23/24	7900189	Managing New Technologies			Reiß

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is assessed in the form of a written examination (60 minutes).

Prerequisites
None

Recommendation
None

Annotation
The course is expected to be offered for the last time in the summer semester 2024.

Below you will find excerpts from events related to this course:

V Managing New Technologies

2545003, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This lecture provides an overview of new technologies in the research areas of biotechnology, nanotechnology and neuroscience as well as basic concepts of technology management. Students should be able to present problems of technology assessment and early recognition of new technologies in a structured way and apply formal approaches to technology management issues in an appropriate manner.

Organizational issues
Bitte melden Sie sich für die Prüfung Nr. 7900169 an, das ist die Prüfungs-Nr. für die schriftliche Prüfung.

(Die Prüfungs-Nr. 7900235 ist eine mündliche Prüfung, zu der sich Studierende nur nach Aufforderung durch das EnTechnon Sekretariat anmelden sollen, wenn Studierende eine mündliche Prüfung haben.)

Literature

- Hausschildt/Salomo: Innovationsmanagement;
- Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle: Gabler Lexikon Technologiemanagement

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

T 7.254 Course: Manufacturing Technology [T-MACH-102105]

Responsible: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	3

Events					
WT 23/24	2149657	Manufacturing Technology	6 SWS	Lecture / Practice (/	Schulze
Exams					
WT 23/24	76-T-MACH-102105	Manufacturing Technology			Schulze
ST 2024	76-T-MACH-102105	Manufacturing Technology			Schulze

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written Exam (180 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Manufacturing Technology

2149657, WS 23/24, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content
The objective of the lecture is to look at manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to impart detailed process knowledge of the common processes. The lecture covers the basic principles of manufacturing technology and deals with the manufacturing processes according to their classification into main groups regarding technical and economic aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Quality control
- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming, plastics engineering)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing

This lucture provides an excursion to an industry company.

Learning Outcomes:

The students ...

- are capable to specify the different manufacturing processes and to explain their functions.
- are able to classify the manufacturing processes by their general structure and functionality according to the specific main groups.
- have the ability to perform a process selection based on their specific characteristics.
- are enabled to identify correlations between different processes and to select a process regarding possible applications.
- are qualified to evaluate different processes regarding specific applications based on technical and economic aspects.
- are experienced to classify manufacturing processes in a process chain and to evaluate their specific influence on surface integrity of workpieces regarding the entire process chain.

Workload:

regular attendance: 63 hours
self-study: 177 hours

Organizational issues
Vorlesungstermine montags und dienstags, Übungstermine mittwochs.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 7.255 Course: Market Research [T-WIWI-107720]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101647 - Data Science: Evidence-based Marketing
M-WIWI-105312 - Marketing and Sales Management
M-WIWI-105714 - Consumer Research
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	3

Events					
ST 2024	2571150	Market Research	2 SWS	Lecture / 🗣	Klarmann
ST 2024	2571151	Market Research Tutorial	1 SWS	Practice / 🗣	Klarmann
Exams					
WT 23/24	7900053	Market Research			Klarmann
ST 2024	7900015	Market Research			Klarmann

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of success takes place through a written exam (70 minutes) with additional aids in the sense of an open book exam. Further details will be announced during the lecture.

Prerequisites
None

Recommendation
None

Annotation
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

Below you will find excerpts from events related to this course:

V **Market Research** — **Lecture (V) On-Site**
2571150, SS 2024, 2 SWS, Language: English, Open in study portal

Content
Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

The aim of this lecture is to give an overview of essential statistical methods. In the lecture students learn the practical use as well as the correct handling of different statistical survey methods and analysis procedures. In addition, emphasis is put on the interpretation of the results after the application of an empirical survey. The derivation of strategic options is an important competence that is required in many companies in order to react optimally to customer needs.

The assessment is carried out (according to §4(2), 3 SPO) in the form of a written open book exam.

The total workload for this course is approximately 135.0 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45.0 hours

Exam and exam preparation: 60.0 hours

Please note that this course has to be completed successfully by students interested in master thesis positions at the chair of marketing.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.256 Course: Marketing Analytics [T-WIWI-103139]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101647 - Data Science: Evidence-based Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	5

Events					
WT 23/24	2572170	Marketing Analytics	2 SWS	Lecture / 🗣	Klarmann
WT 23/24	2572171		1 SWS	Practice / 🗣	Pade
Exams					
WT 23/24	7900082	Marketing Analytics			Klarmann

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative (according to §4(2), 3 of the examination regulation) exam assessment (working on tasks in groups during the lecture).

Prerequisites
The prerequisite for taking the course is the successful completion of the course "Market Research".

Recommendation
It is strongly recommended to complete the course "Market Research" prior to taking the "Marketing Analytics" course.

Annotation
"Marketing Analytics" is offered as a block course with an alternative exam assessment.
Starting in the winter semester 22/23, the course will be scheduled to be completed after two thirds of the semester. For further information, please contact the Marketing and Sales Research Group (marketing.iism.kit.edu). Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing and Sales Research Group.

Below you will find excerpts from events related to this course:

V Marketing Analytics

2572170, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

Students

- receive based on the course market research an overview of advanced empirical methods
- learn in the course of the lecture to handle advanced data collection and data analysis methods
- are based on the acquired knowledge able to interpret results and derive strategic implications

Total workload for 4.5 ECTS: ca. 135 hours.

In order to attend Marketing Analytics, students are required to have passed the course Market Research.

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu).

Literature

- Hanssens, Dominique M., Parsons, Leonard J., Schultz, Randall L. (2003), Market response models: Econometric and time series analysis, 2nd ed, Boston.
- Gelman, Andrew, Hill, Jennifer (2006), Data analysis using regression and multilevel/hierarchical models, New York.
- Cameron, A. Colin, Trivedi, Pravin K. (2005), Microeconometrics: methods and applications, New York.
- Chapman, Christopher, Feit, Elea M. (2015), R for Marketing Research and Analytics, Cham.
- Ledolter, Johannes (2013), Data mining and business analytics with R, New York.

V 2572171, WS 23/24, 1 SWS, Language: English, Open in study portal **Practice (Ü) On-Site**

Content
Tasks parallel to the lecture to work on in a group of students.

Organizational issues
Blockveranstaltung: genaue Uhrzeiten und Raum werden noch bekannt gegeben

T 7.257 Course: Marketing Strategy Business Game [T-WIWI-102835]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Irregular	1

Competence Certificate
The assessment (alternative exam assessment) consists of a group presentation and a subsequent round of questions totalling 20 minutes.

Prerequisites
None

Recommendation
None

Annotation
Please note that only one of the courses from the election block can be chosen in the module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS points in the respective module to all students. Participation in a specific course cannot be guaranteed.
In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

T 7.258 Course: Master's Thesis [T-WIWI-103142]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan des KIT-Studienganges
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101650 - Module Master's Thesis

Type	Credits	Grading scale	Version
Final Thesis	30	Grade to a third	1

Competence Certificate
see module description

Prerequisites
see module description

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline	6 months
Maximum extension period	3 months
Correction period	8 weeks

T 7.259 Course: Matching Theory [T-WIWI-113264]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101500 - Microeconomic Theory

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2500042	Matching Theory	3 SWS	Lecture / Practice (/ 🗣	Okulicz
Exams					
WT 23/24	7900347	Matching Theory			Puppe
ST 2024	7900260	Matching Theory			Puppe

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination (90 minutes)

Below you will find excerpts from events related to this course:

V Matching Theory

2500042, WS 23/24, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
How should we organize recruitment of students to schools? Could we improve the placement of doctors to hospitals? Why there always seems to be a better roommate to the one you currently have? Matching Theory answers all these questions and more. During the course we will formally study mathematical systems of allocating goods and people, and see their many real life applications from organizing kidney exchange to improving dating apps. The course will cover three main topics in Matching Theory and Market Design: (1) assignment problems (e.g., allocation of social housing), (2) two-sided matching (e.g., allocation of children to schools), (3) transferable-utility matching (e.g., labor market).

The students are expected to:

1. Understand the mathematical properties of allocations and commonly used mechanism
2. Understand the connection between Matching Theory and real-life allocation systems
3. Be able to use their knowledge to propose solutions for novel real-life problems

T 7.260 Course: Mathematical Models and Methods for Production Systems [T-MACH-105189]

Responsible: Dr.-Ing. Marion Baumann
Prof. Dr.-Ing. Kai Furmans

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 23/24	2117059	Mathematical models and methods for Production Systems	4 SWS	Lecture / Practice (/	Baumann, Furmans
Exams					
WT 23/24	76-T-MACH-105189	Mathematical models and methods for Production Systems			Baumann, Furmans

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Mathematical models and methods for Production Systems

2117059, WS 23/24, 4 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Media:

black board, lecture notes, presentations

Learning Content:

- single server systems: M/M/1, M/G/1: priority rules, model of failures
- networks: open and closed approximations, exact solutions and approximations
- application to flexible manufacturing systems, AGV (automated guided vehicles) - systems
- modeling of control approaches like constant work in process (ConWIP) or kanban
- discrete-time modeling of queuing systems

Learning Goals:

Students are able to:

- Describe queueing systems with analytical solvable stochastic models,
- Derive approches for modeling and controlling material flow and production systems based on models of queueing theory,
- Use simulation and exakt methods.

Recommendations:

- Basic knowledge of statistic
- recommended compusory optional subject: Stochastics
- recommended lecture: Materials flow in logistic systems (also parallel)

Workload:

regular attendance: 42 hours
self-study: 198 hours

Organizational issues

- **Im Wintersemester 2023/2024 ist die Veranstaltung auf maximal 30 Teilnehmer beschränkt.**
- **Die Anmeldung ist durch Beitritt zum ILIAS-Kurs und Ausfüllen des Anmeldungsformulars (erforderliche Felder beim Beitritt zum ILIAS-Kurs) möglich.**
- **Die Anmeldung ist vom 01.09.2023 bis zum 30.09.2023 möglich.**

Literature

Ronald W. Wolff (1989) Stochastic Modeling and the Theory of Queues, Englewood Cliffs, NJ : Prentice-Hall.
John A. Buzacott, J. George Shanthikumar (1993) Stochastic Models of Manufacturing Systems, Upper Saddle River, NJ : Prentice Hall.

T 7.261 Course: Mathematics for High Dimensional Statistics [T-WIWI-111247]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Irregular	1

Competence Certificate
The assessment consists of an oral exam (approx. 30 min.) taking place in the recess period.

Prerequisites
None

Recommendation
Basic knowledge of mathematics and statistics is assumed.
Knowledge in multivariate statistics is an advantage, but not necessary for the course.

T 7.262 Course: Media Management [T-WIWI-112711]

Responsible: Prof. Dr. Ann-Kristin Kupfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106258 - Digital Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2572192	Media Management	2 SWS	Lecture / 🗣	Kupfer
WT 23/24	2572193	Media Management Exercise	1 SWS	Practice / 🗣	Mitarbeiter
Exams					
WT 23/24	7900135	Media Management			Kupfer
WT 23/24	7900149	Media Management			Kupfer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The control of success is done by the elaboration and presentation of a group task as well as a written exam. Further details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Students are highly encouraged to actively participate in class.

Annotation
The course will take place in the winter term 23/24 for the first time.

Below you will find excerpts from events related to this course:

V Media Management

2572192, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn the theoretical foundations of media management and its most important concepts. They learn both about the key characteristics of both media products and media markets. They further get to know essential business models of media markets. Special emphasis will be given to understanding media consumers and the marketing mix of media products. A tutorial offers the opportunity to apply the key learnings of the lecture.

The learning objectives are as follows:

- Getting to know the theoretical foundations of media management
- Evaluating strategies for media products and services as media-specific marketing mix instruments
- Fostering critical and analytical thinking skills and the application of knowledge to marketing problems
- Improvement of skills and competences in the area of project management within the framework of group work
- Improvement of foreign language skills (business English)

Total time required for 4.5 credit points: approx. 135 hours

Attendance time: 30 hours

Self-study: 105 hours

Organizational issues
Appointments to be announced.

T 7.263 Course: Membrane Technologies in Water Treatment [T-CIWVT-110865]

Responsible: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	2

Events					
ST 2024	2233010	Membrane Technologies in Water Treatment	2 SWS	Lecture / 🗣	Horn, Saravia
ST 2024	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice / 🧩	Horn, Saravia, und Mitarbeiter
Exams					
WT 23/24	7232605	Membrane Technologies in Water Treatment			Horn, Saravia
ST 2024	7233010	Membrane Technologies in Water Treatment			Horn, Saravia

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is an written examination with a duration of 90 minutes (SPO section 4 subsection 2).

Prerequisites
The attendance at the excursions is examination prerequisite.

T 7.264 Course: Metal Forming [T-MACH-105177]

Responsible: Prof. Dr.-Ing. Thomas Herlan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2024	2150681	Metal Forming	2 SWS	Lecture / 🗣	Herlan
Exams					
ST 2024	76-T-MACH-105177	Metal Forming			Herlan

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Metal Forming** — **Lecture (V) On-Site**
2150681, SS 2024, 2 SWS, Language: German, Open in study portal

Content
At the beginning of the lecture the basics of metal forming are briefly introduced. The focus of the lecture is on massive forming (forging, extrusion, rolling) and sheet forming (car body forming, deep drawing, stretch drawing). This includes the systematic treatment of the appropriate metal forming Machines and the corresponding tool technology. Aspects of tribology, as well as basics in material science and aspects of production planning are also discussed briefly. The plastic theory is presented to the extent necessary in order to present the numerical simulation method and the FEM computation of forming processes or tool design. The lecture will be completed by product samples from the forming technology.

The topics are as follows:

- Introduction and basics
- Hot forming
- Metal forming machines
- Tools
- Metallographic fundamentals
- Plastic theory
- Tribology
- Sheet forming
- Extrusion
- Numerical simulation

Learning Outcomes:

The students …

- are able to reflect the basics, forming processes, tools, Machines and equipment of metal forming in an integrated and systematic way.
- are capable to illustrate the differences between the forming processes, tools, machines and equipment with concrete examples and are qualified to analyze and assess them in terms of their suitability for the particular application.
- are also able to transfer and apply the acquired knowledge to other metal forming problems.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Vorlesungstermine freitags, wöchentlich.
Die konkreten Termine werden in der ersten Vorlesung bekannt gegeben und auf der Institutshomepage und ILIAS veröffentlicht.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T 7.265 Course: Methods and Models in Transportation Planning [T-BGU-101797]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6232701	Berechnungsverfahren und Modelle in der Verkehrsplanung	2 SWS	Lecture / Practice (/	Vortisch, Mitarbeiter/innen
Exams					
WT 23/24	8240101797	Methods and Models in Transportation Planning			Vortisch
ST 2024	8240101797	Methods and Models in Transportation Planning			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.266 Course: Methods in Economic Dynamics [T-WIWI-102906]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each summer term	2

Events					
ST 2024	2560240	Methods in Economic Dynamics	1 SWS	Lecture / 🗣	Ott
Exams					
ST 2024	7900108	Methods in Economic Dynamics			Ott

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012] and Economics II [2600014]. Further, it is assumed that students have interest in using quantiative-mathematical methods.

Below you will find excerpts from events related to this course:

V Methods in Economic Dynamics

2560240, SS 2024, 1 SWS, Language: German/English, Open in study portal

Lecture (V)
On-Site

Content
The economic exploitation of inventions is an important part of innovation economics. Intellectual property rights such as patents or trademarks play a central role. Within this workshop, the recording, processing and analysis of such intellectual property rights will be deepened, e.g. considering specific technologies. Students will learn how to work with relational databases, the econometric evaluation of recorded data, and methods for visualising them.

Learning objectives:

The student

- learns to query data sources.
- is able to analyse data with statistical methods.
- visualises and interprets data evaluations (e.g. using dashboards or methods of network analysis).

Recommendations:

An interest in working with data, basic knowledge on databases as well as basic knowledge in economics and statistics are advantageous.

Workload:

The total workload for this course is approximately 45 hours.

- Classes: ca. 5 h
- Self-study: ca. 40 h

Assessment:

Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

Organizational issues
The course is structured along two assignments, the first of which is an individual assignment, whereas the second assignment is a group project. Assignment 1 will be completed within one month's time, whereas assignment 2 will take place on a different date.

Assignment 1 will take place on **24.04.2024** in **Building 01.87, B5.25**. **Assignment 2** will take place on **10.07.2024** in **Building 01.87, B5.25**. The exact time will be announced later.

Students are offered the opportunity to participate in this course jointly with the course “Seminar in Economic Policy”, within the module “Economics of Innovation”. The work in both courses will be strongly related to each other, as students will work on the same topic from two different perspectives. Students in the course “Seminar in Economic Policy” will be provided with the opportunity to write a paper that addresses the results found by the students in the course “Methods in Economic Dynamics”. Taking both courses together will enable the students to earn 4.5 ECTS.

Literature
Relevante Literatur wird in der Vorlesung bekanntgegeben.
(Relevant literature will be announced in the lecture.)

T 7.267 Course: Methods in Innovation Management [T-WIWI-110263]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO). The final grade is composed 75% of the grade of the written paper and 25% of the grade of the presentation.

Prerequisites
None.

Recommendation
Prior attendance of the course “Innovation Management: Concepts, Strategies and Methods” is recommended.

T 7.268 Course: Micro- and Nanosystem Integration for Medical, Fluidic and Optical Applications [T-MACH-108809]

Responsible: apl. Prof. Dr. Ulrich Gengenbach
Dr. Liane Koker
apl. Prof. Dr. Ingo Sieber

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Competence Certificate
Oral exam (Duration: 30min)

Prerequisites
T-MACH-105695 "Selected topics of system integration for micro- and nanotechnology" must not be started.

T 7.269 Course: Micro- and nanotechnology in implant technology [T-MACH-111030]

Responsible: Dr. Ralf Ahrens
Dr. Patrick Wolfgang Doll

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	2141871	Micro- and nanotechnology in implant technology:	2 SWS	Lecture / 🗣	Doll, Ahrens, Guber
ST 2024	2141871	Micro- and nanotechnology in implant technology:	2 SWS	Lecture / 🏵	Doll, Ahrens, Guber

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral Exam (20 min.)

Prerequisites
None

Below you will find excerpts from events related to this course:

V Micro- and nanotechnology in implant technology:

2141871, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
siehe oben

Literature
Wintermantel, Erich, Ha, Suk-Woo, Medizintechnik, Springer-Verlag Berlin Heidelberg 2009. ISBN 978-3-540-93936-8 .

Brunette, D.M., Tengvall, P., Textor, M., Thomsen, P. Titanium in Medicine, Springer-Verlag Berlin Heidelberg 2001. ISBN 978-3-642-56486-4 .

Vorlesungsskript

V Micro- and nanotechnology in implant technology:

2141871, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
siehe oben

Organizational issues
****

Entfällt in diesem Sommersemester und wird nächstes Wintersemester angeboten!
****

Literature
Wintermantel, Erich, Ha, Suk-Woo, Medizintechnik, Springer-Verlag Berlin Heidelberg 2009. ISBN 978-3-540-93936-8 .

Brunette, D.M., Tengvall, P., Textor, M., Thomsen, P. Titanium in Medicine, Springer-Verlag Berlin Heidelberg 2001. ISBN 978-3-642-56486-4 .

Vorlesungsskript

T 7.270 Course: Microactuators [T-MACH-101910]

Responsible: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-ETIT-101158 - Sensor Technology I
M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS
M-MACH-101292 - Microoptics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	2142881	Microactuators	2 SWS	Lecture / 🗣	Kohl
Exams					
WT 23/24	7600002	Microactuators			Kohl
WT 23/24	76-T-MACH-101910	Microactuators			Kohl
ST 2024	76-T-MACH-101910	Microactuators			Kohl

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Microactuators

2142881, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
- Basic knowledge in the material science of the actuation principles
- Layout and design optimization
- Fabrication technologies
- Selected developments
- Applications

The lecture includes amongst others the following topics:

- Microelectromechnical systems: linear actuators, microrelais, micromotors
- Medical technology and life sciences: Microvalves, micropumps, microfluidic systems
- Microrobotics: Microgrippers, polymer actuators (smart muscle)
- Information technology: Optical switches, mirror systems, read/write heads

Literature
- Folienskript "Mikroaktorik"
- D. Jendritza, Technischer Einsatz Neuer Aktoren: Grundlagen, Werkstoffe, Designregeln und Anwendungsbeispiele, Expert-Verlag, 3. Auflage, 2008
- M. Kohl, Shape Memory Microactuators, M. Kohl, Springer-Verlag Berlin, 2004
- N.TR. Nguyen, S.T. Wereley, Fundamentals and applications of Microfluidics, Artech House, Inc. 2002
- H. Zappe, Fundamentals of Micro-Optics, Cambride University Press 2010

T 7.271 Course: Microbiology for Engineers [T-CIWVT-108871]

Responsible: Prof. Dr. Thomas Schwartz
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2233840	Microbiology for Engineers	2 SWS	Lecture / ✕	Schwartz
Exams					
ST 2024	7232633	Microbiology for Engineers			Schwartz

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Prerequisites
None

T 7.272 Course: Mixed Integer Programming I [T-WIWI-102719]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
WT 23/24	2550138	Mixed-integer Programming I	2 SWS	Lecture / 🗣	Stein
WT 23/24	2550139	Exercises Mixted Integer Programming I		Practice / 🗣	Stein, Beck
ST 2024	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 23/24	7900180_WS2324_HK	Mixed Integer Programming I			Stein
ST 2024	7900014_SS2024_NK	Mixed Integer Programming I			Stein

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of *Mixed Integer Programming II* [25140]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from events related to this course:

V **Mixed-integer Programming I** — **Lecture (V) On-Site**
2550138, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, and portfolio optimization with limitations on the number of securities. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *linear* optimization problems and is structured as follows:

- Introduction, solvability, and basic concepts
- LP relaxation and error bounds for roundings
- Branch-and-bound method
- Gomory's cutting plane method
- Benders decomposition

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *nonlinear* optimization problems forms the contents of the lecture "Mixed-integer Programming II".

Learning objectives:

The student

- knows and understands the fundamentals of linear mixed integer programming,
- is able to choose, design and apply modern techniques of linear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

V Mixed-integer Programming II

Lecture (V)
On-Site

2550140, SS 2024, 2 SWS, Language: German, Open in study portal

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 7.273 Course: Mixed Integer Programming II [T-WIWI-102720]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2024	2550140	Mixed-integer Programming II	2 SWS	Lecture / 🗣	Stein
ST 2024	2550141	Exercise to Mixed-integer Programming II	1 SWS	Practice / 🗣	Stein, Schwarze
Exams					
ST 2024	7900009_SS2024_HK	Mixed Integer Programming II			Stein

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.
The examination is held in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of *Mixed Integer Programming I* [2550138]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

Below you will find excerpts from events related to this course:

V Mixed-integer Programming II

2550140, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer *nonlinear* optimization problems and is structured as follows:

- Continuous relaxation and error bounds for roundings
- Branch-and-Bound for convex and nonconvex problems
- Generalized Benders decomposition
- Outer approximation methods
- Lagrange relaxation
- Dantzig-Wolfe decomposition
- Heuristics

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of mixed-integer *linear* optimization problems forms the contents of the lecture "Mixed-integer Programming I".

Learning objectives:

The student

- knows and understands the fundamentals of nonlinear mixed integer programming,
- is able to choose, design and apply modern techniques of nonlinear mixed integer programming in practice.

Literature

- C.A. Floudas, Nonlinear and Mixed-Integer Optimization: Fundamentals and Applications, Oxford University Press, 1995
- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
- G.L. Nemhauser, L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1988
- M. Tawarmalani, N.V. Sahinidis, Convexification and Global Optimization in Continuous and Mixed-Integer Nonlinear Programming, Kluwer, 2002.

T 7.274 Course: Mobile Machines [T-MACH-105168]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	9	Grade to a third	Each summer term	1

Events					
ST 2024	2114073	Mobile Machines	4 SWS	Lecture / 🗣	Geimer, Kazenwadel
Exams					
WT 23/24	76T-MACH-105168	Mobile Machines			Geimer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (45 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
none

Recommendation
Knowledge in Fluid Power Systems is required. It is recommended to attend the course *Fluid Power Systems* [2114093] beforehand.

Annotation
After completion of the course the students have knowledge of:

- a wide range of mobile machines
- operation modes and working cycles of importmant mobile machines
- selected subsystems and components

Content:

- Introduction of the required components and machines
- Basics and structure of mobile machines
- Practical insight in the development techniques

Below you will find excerpts from events related to this course:

V Mobile Machines

2114073, SS 2024, 4 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Introduction of the required components and machines
- Basics of the structure of the whole system
- Practical insight in the development techniques

Knowledge in Fluid Power is required.

Recommendations:

It is recommended to attend the course *Fluid Power Systems* [2114093] beforehand.

- regular attendance: 42 hours
- self-study: 184 hours

T 7.275 Course: Mobility Services and New Forms of Mobility [T-BGU-103425]

Responsible: PD Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6232811	Mobility Services and New Forms of Mobility	2 SWS	Lecture / 🗣	Kagerbauer
Exams					
WT 23/24	8240103425	Mobility Services and new Forms of Mobility			Kagerbauer
ST 2024	8240103425	Mobility Services and new Forms of Mobility			Kagerbauer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.276 Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102808 - Digital Service Systems in Industry
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 23/24	2550490	Modellieren und OR-Software: Fortgeschrittene Themen	3 SWS	Practical course /	Pomes, Linner, Nickel
Exams					
WT 23/24	7900071	Modeling and OR-Software: Advanced Topics			Nickel
ST 2024	7900188	Modeling and OR-Software: Advanced Topics			Nickel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment is a written examination. The examination is held in every semester. The prerequisite can only be obtained in semesters in which the course exercises are offered.

Prerequisites
Prerequisite for admission to the exam is the successful participation in the exercises. This includes the processing and presentation of exercises.

Recommendation
Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

Successful completion of the course *Modeling and OR-Software: Introduction*.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Modellieren und OR-Software: Fortgeschrittene Themen

2550490, WS 23/24, 3 SWS, Language: German, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The advanced course is designated for Master students that already attended the introductory course or gained equivalent experience elsewhere, e.g. during a seminar or bachelor thesis. We will work on advanced topics and methods in OR, among others cutting planes, column generation and constraint programming. The Software used for the exercises is IBM ILOG CPLEX Optimization Studio. The associated modelling progamming languages are OPL and ILOG Script.

Organizational issues
Link zur Bewerbung:

http://go.wiwi.kit.edu/OR_Bewerbung

Bewerberzeitraum:

01.09.2023 00:00 - 12.10.2023 23:55

T 7.277 Course: Modeling and Simulation [T-WIWI-112685]

Responsible: Prof. Dr. Sanja Lazarova-Molnar
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2511100	Modeling and Simulation	2 SWS	Lecture	Lazarova-Molnar
ST 2024	2511101	Exercises Modeling and Simulation	1 SWS	Practice	Lazarova-Molnar
Exams					
WT 23/24	79AIFB_MaS_A6	Modeling and Simulation			Lazarova-Molnar
ST 2024	79AIFB_MaS_C6	Modeling and Simulation (Registration until 15 July 2024)			Lazarova-Molnar

Competence Certificate
Depending on the number of participants in the course, the exam will be offered either as an oral exam (20 min), or as a written exam (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendation
Some experience in programming and knowledge of basic mathematics and statistics.

Annotation
Instruction is in the form of lectures and exercises. A detailed course schedule will be published before the start of the semester.

Below you will find excerpts from events related to this course:

V Modeling and Simulation

2511100, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Modeling and Simulation is the most widely used operations research / systems engineering technique for designing new systems and optimizing the performance of existing systems. In one way or another, just about every engineering or scientific field uses simulation as an exploration, modeling, or analysis technique. The course is designed to provide students with basic knowledge of modeling and simulation approaches and to provide them with first experience of using a simulation package. The course will focus on modeling and simulation of real-world discrete event systems. Examples of discrete events are customer arrivals at a queue of a service desk, machine failures in manufacturing systems, telephone calls in a call center, etc. Moreover, continuous and hybrid models will be also discussed. Topics include Discrete-Event Simulation, Input Modeling, Output Analysis, Random Number Generation, Verification and Validation, Stochastic Petri Nets and Markov Chains.

Competence Certificate

Depending on the number of participants in the course, the exam will be offered either as an oral exam (20 min), or as a written exam (60 min).

The exam takes place every semester and can be repeated at every regular examination date.

Learning Objectives

Knowledge:

- Demonstrate knowledge about general and specific theories, challenges, algorithms, methods, technologies, and tools related to modelling and simulation
- Demonstrate knowledge of two important classes of simulation:
    - Discrete-event Monte-Carlo simulation,
    - Continuous simulation with ODEs
- Demonstrate knowledge of algorithms necessary to build a simulator

Skills:

- Analyse suitability of an approach/tool for a given modelling problem
- Understand simulation models of various types
- Demonstrate methods and techniques to overcome common challenges in modelling and simulation
- Model simulation input data
- Analyse and model discrete stochastic systems
- Analyse and interpret simulation results

Competences:

- Use different methods to conduct simulation-based analysis of real-world data
- Build and simulate stochastic models
- Use simulation software

Prerequisites

Some experience in programming and knowledge of basic mathematics and statistics

Form of instruction

Lectures and exercises. A detailed course plan will be published before the semester start.

Literature
Discrete-Event System Simulation, 5th Edition

Jerry Banks, John S. Carson, II, Barry L. Nelson and David M. Nicol

T 7.278 Course: Modeling the Dynamics of Financial Markets [T-WIWI-113414]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-106660 - Modeling the Dynamics of Financial Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each summer term	1

Events					
ST 2024	2600004	Essentials for Dynamic Financial Machine Learning		Lecture / Practice (/	Ulrich
ST 2024	2600257	Dynamic Capital Market Theory		Lecture / Practice (/	Ulrich

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
The examination takes the form of a one-hour written comprehensive examination on the two courses "Dynamic Capital Marke Theory" and "Essentials for Dynamic Financial Machine Learning".

Recommendation
Recommendation: Knowledge in the fields of Advanced Statistics, Deep Learning, Financial Economics, Differential Equations, Optimization.

Below you will find excerpts from events related to this course:

V Essentials for Dynamic Financial Machine Learning

2600004, SS 2024, SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content
This course teaches students to work with financial data. Students learn algorithms that are used to learn key quantities of dynamic capital markets, such as time-varying risk premia, volatility and unobserved state variables. The course covers the following concepts:

* Multivariate time series modeling
* Dynamic volatility modeling
* Handling big financial data
* Estimating risk premia
* Kalman Filtering

Lectures develop all material on the whiteboard. Tutoriums solve and discuss python solutions to selected problems.

V Dynamic Capital Market Theory

2600257, SS 2024, SWS, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Content
This course offers an introduction to the dynamics of capital markets. Portfolios and asset prices move dynamically across time. This course teaches state-of-the-art models to help understand why this is the case. Describing and managing dynamic systems in engineering is done via dynamic programming and optimal control. This course develops the theory of dynamic programming in continuous time and applies it to solve portfolio choice and corporate investment decisions. These concepts are key for financial engineering and model-based refinforcement learning.

Students obtain proficiency in the following topics:
* Dynamic Asset Pricing and Portfolio Choice Theory
* Dynamic modeling in discrete and continuous time
* Stochastic Calculus
* Theory of Dynamic Programming
* Pricing of bond, equity, futures and option markets

Lectures develop all concepts on the whiteboard, while exercises are solved during weekly tutorials.

T 7.279 Course: Morphodynamics [T-BGU-101859]

Responsible: Prof. Dr. Mario Jorge Rodrigues Pereira da Franca
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Grading scale	Version
Oral examination	3	Grade to a third	1

Events					
ST 2024	6222805	Landscape and River Morphology	2 SWS	Lecture / Practice (/	Rodrigues Pereira da Franca

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
See German version.

Prerequisites
None

T 7.280 Course: Multicriteria Optimization [T-WIWI-111587]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.
The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The course is offered every second winter semester (starting WiSe 22/23). The curriculum of the next three years is available online (www.ior.kit.edu).

Contents:

Multicriteria optimization deals with optimization problems with multiple objective functions. In practice, the minimization or maximization of several objectives often conflict with each other, such as weight and stability of mechanical components, return and risk of stock portfolios, or cost and duration of transports. Various scalarization approaches allow one to formulate single-objective problems that can be solved using nonlinear or global optimization techniques, and whose optimal points have a reasonable interpretation for the underlying multicriteria problem.

However, some seemingly obvious scalarization approaches suffer from various drawbacks, so that regardless of scalarization approaches, it is necessary to clarify what is meant by the solution of a multicriteria optimization problem in the first place. For such Pareto-optimal points, optimality conditions and solution procedures based on them can be formulated. From the usually non-unique Pareto set, decision makers finally choose an alternative based on their subjective preferences.

The lecture gives a mathematically sound introduction to multicriteria optimization and is structured as follows:

- Introductory examples and terminology
- Solution concepts
- Methods for the determination of the Pareto set
- Selection of Pareto-optimal points under subjective preferences

T 7.281 Course: Multivariate Statistical Methods [T-WIWI-103124]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-101639 - Econometrics and Statistics II
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Competence Certificate
Witten examination lasting 60 minutes.

The examination is offered during the examination period of the lecture semester. Only repeaters (and not first-time writers) are admitted to the repeat examination in the examination period of the following semester.

Prerequisites
None

Recommendation
The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course ''Advanced Statistics''. Without this, participation in the course is not advised.

Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

Annotation
The course is offered irregularly. Detailed information can be found on the chair's website.

T 7.282 Course: Nano-Optics [T-PHYS-102282]

Responsible: PD Dr. Andreas Naber
Organisation: KIT Department of Physics
Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Version
Oral examination	8	Grade to a third	2

Events					
WT 23/24	4020021	Nano-Optics	3 SWS	Lecture / 🗣	Naber
WT 23/24	4020022	Exercises to Nano-Optics	1 SWS	Practice / 🗣	Naber
Exams					
WT 23/24	7800099	Nano-Optics			Naber

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.283 Course: Nanotribology and -Mechanics [T-MACH-102167]

Responsible: Prof. Dr. Martin Dienwiebel
apl. Prof. Dr. Hendrik Hölscher

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	5

Events					
WT 23/24	2182712	Nanotribology and -Mechanics	2 SWS	Block / 🗣	Dienwiebel
ST 2024	2182712	Nanotribology and -Mechanics	2 SWS	Lecture / Practice (/ 🗣	Dienwiebel
Exams					
WT 23/24	76-T-MACH-102167	Nanotribology and -Mechanics			Dienwiebel

Legend: 📱 Online, 🔗 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, about 25 min

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics and physics

Below you will find excerpts from events related to this course:

V **Nanotribology and -Mechanics** **Block (B) On-Site**
2182712, WS 23/24, 2 SWS, Language: English, Open in study portal

Content
In the summer semester the lecture is offered in German and in the winter semester in English!

Part 1: Fundamentals of nanotribology

- General tribology / nanotechnology
- Forces and dissipation on the nanometer scale
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Carbon-based tribosystems
- Electronic friction
- Nanotribology in liquids
- Atomic abrasion
- nanolubrication

Part 2: Topical papers

The student can

- explain the physical foundations and common models used in the field of nanotribology and nanomechanics
- describe the most important experimental methods in nanotribology
- critically evaluate scientific papers on nanotribological issues with respect to their substantial quality

preliminary knowlegde in mathematics and physics recommended

regular attendance: 22,5 hours
preparation for presentation: 22,5 hours
self-study: 75 hours

presentation (40%) and oral examination (30 min, 60%)
no tools or reference materials

Organizational issues
Email registration to lecturer by 12/10/2023: martin.dienwiebel@kit.edu

Anmeldung per Email bis zum 12.10.2023 an den Dozenten: martin.dienwiebel@kit.edu

Literature
Tafelbilder, Folien, Kopien von Artikeln

V **Nanotribology and -Mechanics** **Lecture / Practice (VÜ)**
2182712, SS 2024, 2 SWS, Language: German, Open in study portal **On-Site**

Content
In the summer semester the lecture is offered in German and in the winter semester in English!

Part 1: Fundamentals of nanotribology

- General tribology / nanotechnology
- Forces and dissipation on the nanometer scale
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Carbon-based tribosystems
- Electronic friction
- Nanotribology in liquids
- Atomic abrasion
- nanolubrication

Part 2: Topical papers

The student can

- explain the physical foundations and common models used in the field of nanotribology and nanomechanics
- describe the most important experimental methods in nanotribology
- critically evaluate scientific papers on nanotribological issues with respect to their substantial quality

preliminary knowlegde in mathematics and physics recommended

regular attendance: 22,5 hours
preparation for presentation: 22,5 hours
self-study: 75 hours

presentation (40%) and oral examination (30 min, 60%)
no tools or reference materials

Organizational issues
Die Vorlesung wird auf Deutsch (SoSe) und auf Englisch (WiSe) angeboten!

Kontakt: martin.dienwiebel@kit.edu

Literature
Edward L. Wolf
Nanophysics and Nanotechnology, Wiley-VCH, 2006

C. Mathew Mate
Tribology on the Small Scale: A Bottom Up Approach to Friction, Lubrication, and Wear (Mesoscopic Physics and Nanotechnology) 1st Edition, Oxford University Press

Tafelbilder, Folien, Kopien von Artikeln

T 7.284 Course: Nature-Inspired Optimization Methods [T-WIWI-102679]

Responsible: Prof. Dr. Pradyumn Kumar Shukla
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2511106	Nature-Inspired Optimization Methods	2 SWS	Lecture /	Shukla
ST 2024	2511107	Übungen zu Nature-Inspired Optimization Methods	1 SWS	Practice /	Shukla
Exams					
ST 2024	79AIFB_NOM_C1	Nature-Inspired Optimization Methods (Registration until 15 July 2024)			Shukla

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Please note: no exam can be offered in the winter semester 2023/2024.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Nature-Inspired Optimization Methods

2511106, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

Learning objectives:

Students learn:

- Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization
- Different aspects and limitation of the methods
- Applications of such methods
- Multi-objective optimization methods
- Constraint handling methods
- Different aspects in parallelization and computing platforms

Literature
* E. L. Aarts and J. K. Lenstra: 'Local Search in Combinatorial Optimization'. Wiley, 1997 * D. Corne and M. Dorigo and F. Glover: 'New Ideas in Optimization'. McGraw-Hill, 1999 * C. Reeves: 'Modern Heuristic Techniques for Combinatorial Optimization'. McGraw-Hill, 1995 * Z. Michalewicz, D. B. Fogel: How to solve it: Modern Heuristics. Springer, 1999 * E. Bonabeau, M. Dorigo, G. Theraulaz: 'Swarm Intelligence'. Oxford University Press, 1999 * A. E. Eiben, J. E. Smith: 'Introduction to Evolutionary Computation'. * M. Dorigo, T. Stützle: 'Ant Colony Optimization'. Bradford Book, 2004 Springer, 2003

T 7.285 Course: Non- and Semiparametrics [T-WIWI-103126]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
WT 23/24	2521300	Non- and Semiparametrics	2 SWS	Lecture	Schienle
WT 23/24	2521301		2 SWS	Practice	Schienle, Rüter, Wolffram
Exams					
WT 23/24	7900009	Non- and Semiparametrics			Schienle

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course *"Applied Econometrics"* [2520020]

Annotation
The course takes place every second winter semester: 2018/19 then 2020/21

Below you will find excerpts from events related to this course:

V Non- and Semiparametrics

2521300, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Learning objectives:

The student

- has profound knowledge of non- and semiparametric estimation methods
- is capable of implementing these methods using statistical software and using them to assess empirical problems

Content:

Kernel density estimation, local constant and local linear regression, bandwidth choice, series and sieve estimators, additive models, semiparametric models

Requirements:

It is recommended to attend the course *Applied Econometrics* prior to this course.

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Literature
Li, Racine: Nonparametric Econometrics: Theory and Practice. Princeton University Press, 2007.

T 7.286 Course: Nonlinear Control Systems [T-ETIT-100980]

Responsible: Dr.-Ing. Mathias Kluwe
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101157 - Control Engineering II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2303173	Nichtlineare Regelungssysteme	2 SWS	Lecture / 🗣	Kluwe
Exams					
WT 23/24	7303173	Nonlinear Control Systems			Kluwe
ST 2024	7303173	Nonlinear Control Systems			Kluwe

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.287 Course: Nonlinear Optimization I [T-WIWI-102724]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	4

Events					
WT 23/24	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 23/24	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Schwarze
Exams					
WT 23/24	7900001_WS2324_HK	Nonlinear Optimization I			Stein
ST 2024	7900202_SS2024_NK	Nonlinear Optimization I			Stein

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam. The exam takes place in the semester of the lecture and in the following semester.
The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

Annotation
Part I and II of the lecture are held consecutively in the *same* semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization I

2550111, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature
O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.288 Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each winter term	6

Events					
WT 23/24	2550111	Nonlinear Optimization I	2 SWS	Lecture / 🗣	Stein
WT 23/24	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Schwarze
WT 23/24	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 23/24	7900003_WS2324_HK	Nonlinear Optimization I and II			Stein
ST 2024	7900204_SS2024_NK	Nonlinear Optimization I and II			Stein

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization I

2550111, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *with* constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.

Literature
O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

V

Nonlinear Optimization II

2550113, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature
O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.289 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2550112	Exercises Nonlinear Optimization I + II		Practice / 🗣	Stein, Schwarze
WT 23/24	2550113	Nonlinear Optimization II	2 SWS	Lecture / 🗣	Stein
Exams					
WT 23/24	7900002_WS2324_HK	Nonlinear Optimization II			Stein
ST 2024	7900203_SS2024_NK	Nonlinear Optimization II			Stein

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The exam takes place in the semester of the lecture and in the following semester.

The exam can also be combined with the examination of *Nonlinear Optimization I* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events related to this course:

V Nonlinear Optimization II

2550113, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:

The treatment of optimization problems *without* constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively *in the same semester*.

Learning objectives:

The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

Literature
O. Stein, Grundzüge der Nichtlinearen Optimierung, 2. Aufl., SpringerSpektrum, 2021

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 7.290 Course: Novel Actuators and Sensors [T-MACH-102152]

Responsible: Prof. Dr. Manfred Kohl
Dr. Martin Sommer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101294 - Nanotechnology
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	3

Events					
WT 23/24	2141865	Novel actuators and sensors	2 SWS	Lecture / 🗣	Kohl, Sommer
Exams					
WT 23/24	76-T-MACH-102152	Novel Actuators and Sensors			Kohl, Sommer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 minutes

Prerequisites
none

Below you will find excerpts from events related to this course:

V Novel actuators and sensors

2141865, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Literature
- Vorlesungsskript "Neue Aktoren" und Folienskript "Sensoren"
- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007
- "Sensors Update", Edited by H.Baltes, W. Göpel, J. Hesse, VCH, 1996, ISBN: 3-527-29432-5
- "Multivariate Datenanalyse – Methodik und Anwendungen in der Chemie", R. Henrion, G. Henrion, Springer 1994, ISBN 3-540-58188-X

T 7.291 Course: Online Concepts for Karlsruhe City Retailers [T-WIWI-111848]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-105312 - Marketing and Sales Management
M-WIWI-106258 - Digital Marketing

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	2

Events					
ST 2024	2571184	Online concepts for Karlsruhe city retailers	2 SWS	Others (sons / 🗣	Kupfer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment:

- presentations in teams (in each case to the extent of approx. 15 minutes per team with subsequent discussio)
- delivery of a written elaboration per team.

Annotation
Please note that an application is required to participate in this workshop. The application phase usually takes place at the beginning of the lecture period in the summer semester. More information on the application process is usually available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the lecture period in the summer semester.

Below you will find excerpts from events related to this course:

V Online concepts for Karlsruhe city retailers

2571184, SS 2024, 2 SWS, Language: German, Open in study portal

Others (sonst.)
On-Site

Content
Content
As part of a practical project in cooperation with the city marketing department of KME Karlsruhe Marketing und Event GmbH, students will have the opportunity to directly interact with retailers in Karlsruhe. Challenges of the digitalization of brick-and-mortar retailing will be analyzed and solutions will be developed and implemented.

In a theoretical part at the beginning of the event, students will gain an insight into the theoretical foundations of specific online marketing instruments. In cooperation with Karlsruhe City Marketing, students are taught application-oriented skills in online marketing tools, such as content management systems, social media platforms, search engine optimization or Google Ads campaigns.

In the practical part of the course, student teams cooperate with a real retailer in Karlsruhe's city center and learn how to analyze and optimize online presences and digital solutions based on key performance indicators. Possible use cases range from social media communication and website optimization to the introduction of innovative pricing and payment methods. In this way, students are given the tools for developing, maintaining and optimizing individual websites and digital solutions in stationary retailing.

Learning objectives result accordingly as follows:
- Learning of theoretical basics of central, application-oriented tools of online marketing
- Application and practical deep-dive of the acquired knowledge in a real case
- Concise and structured presentation of results

Total time required for 3 credit points: approx. 90.0 hours

Attendance time: 12 hours

Preparation and wrap-up of the course: 58 hours

Exam and exam preparation: 20 hours

T 7.292 Course: Operation Methods for Earthmoving [T-BGU-101801]

Responsible: Dr.-Ing. Heinrich Schlick
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each winter term	1

Events					
WT 23/24	6241905	Erdbau	1 SWS	Lecture / 🗣	Haghsheno, Schwarzweller
Exams					
WT 23/24	8240101801	Operation Methods for Earthmoving			Schneider

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.293 Course: Operation Methods for Foundation and Marine Construction [T-BGU-101832]

Responsible: Dr.-Ing. Harald Schneider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each winter term	1

Events					
WT 23/24	6241904	Tiefbau	1 SWS	Lecture / 🗣	Haghsheno, Schneider
Exams					
WT 23/24	8240101832	Operation Methods for Foundation and Marine Construction			Schneider

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.294 Course: Operations Research in Health Care Management [T-WIWI-102884]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Events					
ST 2024	2550495	Operations Research in Health Care Management	2 SWS	Lecture /	Graß
ST 2024	2550496	Übungen zu OR im Health Care Management	1 SWS	Practice /	Graß
Exams					
WT 23/24	7900031	Operations Research in Health Care Management			Nickel

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

Below you will find excerpts from events related to this course:

V Operations Research in Health Care Management

2550495, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Literature
Weiterführende Literatur:

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
- Hall: Patient flow: reducing delay in healthcare delivery, Springer, 2006

T 7.295 Course: Operations Research in Supply Chain Management [T-WIWI-102715]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Exams			
WT 23/24	7900076	Operations Research in Supply Chain Management	Nickel
ST 2024	7900249	Operations Research in Supply Chain Management	Nickel

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module Introduction to Operations Research and in the lectures Facility Location and Strategic SCM,Tactical and operational SCMis assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 7.296 Course: Optical Transmitters and Receivers [T-ETIT-100639]

Responsible: Prof. Dr. Wolfgang Freude
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	2

Events					
WT 23/24	2309460	Optical Transmitters and Receivers	2 SWS	Lecture /	Freude, Bremauer, Mahmud
WT 23/24	2309461	Tutorial for 2309460 Optical Transmitters and Receivers	2 SWS	Practice /	Freude, N.N., Mahmud
Exams					
WT 23/24	7300022	Optical Transmitters and Receivers - repeat exam			Freude
WT 23/24	7309460	Optical Transmitters and Receivers			Freude
ST 2024	7309460	Optical Transmitters and Receivers			Freude

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Prerequisites
none

T 7.297 Course: Optical Waveguides and Fibers [T-ETIT-101945]

Responsible: Prof. Dr.-Ing. Christian Koos
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Microoptics
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2309464	Optical Waveguides and Fibers	2 SWS	Lecture / 🗣	Koos, N.N., Bao, Kelany
WT 23/24	2309465	Tutorial for 2309464 Optical Waveguides and Fibers	1 SWS	Practice / 🗣	Koos, N.N., Bao
Exams					
WT 23/24	7309464	Optical Waveguides and Fibers			Koos
ST 2024	7309464	Optical Waveguides and Fibers			Koos

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.298 Course: Optimization Models and Applications [T-WIWI-110162]

Responsible: Dr. Nathan Sudermann-Merx
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	1

Competence Certificate
The examination will take place for the last time in the winter semester 2020/2021.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

The prerequisite for participation in the exam is the achievement of a minimum number of points in delivery sheets. Details will be announced at the beginning of the course.

Prerequisites
None.

Annotation
The course will take place for the last time in the winter semester 20/21.

T 7.299 Course: Optimization under Uncertainty [T-WIWI-106545]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2550464	Optimization Under Uncertainty	2 SWS	Lecture /	Rebennack
WT 23/24	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	1 SWS	Practice /	Rebennack
WT 23/24	2550466		2 SWS	Others (sons	Rebennack
Exams					
WT 23/24	7900240	Optimization under Uncertainty			Rebennack
WT 23/24	7900355	Optimization under Uncertainty			Rebennack
ST 2024	7900309	Optimization under Uncertainty			Rebennack

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites
None.

T 7.300 Course: Optoelectronic Components [T-ETIT-101907]

Responsible: Prof. Dr. Wolfgang Freude
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101287 - Microsystem Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2309486	Optoelectronic Components	2 SWS	Lecture / 🏵	Randel
ST 2024	2309487	Optoelectronic Components (Tutorial)	1 SWS	Practice / 🏵	Randel
Exams					
WT 23/24	7309486	Optoelectronic Components			Freude
ST 2024	7309486	Optoelectronic Components			Randel

Legend: 🖥 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.301 Course: Panel Data [T-WIWI-103127]

Responsible: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2520320	Panel Data	2 SWS	Lecture	Heller
ST 2024	2520321	Übungen zu Paneldaten	2 SWS	Practice	Heller

Competence Certificate
The performance assessment is an alternative exam assessment in the form of a one-hour examination comprising a written and an oral part. The examination takes place as an individual examination or in groups of two.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Panel Data

2520320, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Content:

Fixed-Effects-Models, Random-Effects-Models, Time-Demeaning

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Exam preparation: 40 hours

Literature
Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. Cambridge and London: MIT Press.

Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach* (5th ed.). Mason, Ohio: South-Western Cengage Learning.

T 7.302 Course: Parametric Optimization [T-WIWI-102855]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The successful completion of the exercises is required for admission to the written exam.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 7.303 Course: Patent Law [T-INFO-101310]

Responsible: Patric Werner
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Events					
ST 2024	24656	Patent Law	2 SWS	Lecture / 🗣	Werner
Exams					
WT 23/24	7500006	Patent Law			Sattler, Matz
ST 2024	7500109	Patent Law			Sattler

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.304 Course: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 7.305 Course: PH APL-ING-TL02 [T-WIWI-106292]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 7.306 Course: PH APL-ING-TL03 [T-WIWI-106293]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 7.307 Course: PH APL-ING-TL04 ub [T-WIWI-106294]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 7.308 Course: PH APL-ING-TL05 ub [T-WIWI-106295]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 7.309 Course: PH APL-ING-TL06 ub [T-WIWI-106296]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Once	1

T 7.310 Course: PH APL-ING-TL07 [T-WIWI-108384]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Once	1

T 7.311 Course: Physical Basics of Laser Technology [T-MACH-102102]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each winter term	4

Events					
WT 23/24	2181612	Physical basics of laser technology	3 SWS	Lecture / Practice (/ 🗣	Schneider
Exams					
WT 23/24	76-T-MACH-102102	Physical Basics of Laser Technology			Schneider
ST 2024	76-T-MACH-102102	Physical Basics of Laser Technology			Schneider

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with brick Laser Material Processing [T-MACH-112763], brick Laser Application in Automotive Engineering [T-MACH-105164] and brick Physical Basics of Laser Technology [T-MACH-109084]

Recommendation
Basic knowledge of physics, chemistry and material science

Below you will find excerpts from events related to this course:

V Physical basics of laser technology

2181612, WS 23/24, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Based on the description of the physical basics about the formation and the properties of laser light the lecture goes through the different types of laser beam sources used in industry these days. The lecture focuses on the usage of lasers especially in materials engineering. Other areas like measurement technology or medical applications are also mentioned.

- physical basics of laser technology
- laser beam sources (solid state, diode, gas, liquid and other lasers)
- beam properties, guiding and shaping
- lasers in materials processing
- lasers in measurement technology
- lasers for medical applications
- savety aspects

The lecture is complemented by a tutorial.

The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of different laser sources.
- can describe the influence of laser, material and process parameters for the most important methods of laser-based materials processing and choose laser sources suitable for specific applications.
- can illustrate the possible applications of laser sources in measurement and medicine technology
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

regular attendance: 33,5 hours
self-study: 116,5 hours

The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

It is allowed to select only one of the lectures "Laser in automotive engineering" (2182642) or "Physical basics of laser technology" (2181612) during the Bachelor and Master studies.

Organizational issues
Termine für die Übung werden in der Vorlesung bekannt gegeben!

Literature
F. K. Kneubühl, M. W. Sigrist: Laser, 2008, Vieweg+Teubner

T. Graf: Laser - Grundlagen der Laserstrahlerzeugung 2015, Springer Vieweg

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

H. Hügel, T. Graf: Laser in der Fertigung, 2014, Springer Vieweg

J. Eichler, H.-J. Eichler: Laser - Bauformen, Strahlführung, Anwendungen, 2015, Springer

W. T. Silfvast: Laser Fundamentals, 2004, Cambridge University Press

W. M. Steen: Laser Material Processing, 2010, Springer

T 7.312 Course: Physics for Engineers [T-MACH-100530]

Responsible: Prof. Dr. Martin Dienwiebel
Prof. Dr. Peter Gumbsch
apl. Prof. Dr. Alexander Nesterov-Müller
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	1

Events					
ST 2024	2142890	Physics for Engineers	4 SWS	Lecture / Practice (/ 🗣	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch
Exams					
WT 23/24	76-T-MACH-100530	Physics for Engineers			Gumbsch, Dienwiebel, Nesterov-Müller, Weygand
ST 2024	76-T-MACH-100530	Physics for Engineers			Gumbsch, Weygand, Nesterov-Müller, Dienwiebel

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam 90 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V Physics for Engineers

2142890, SS 2024, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
1) Foundations of solid state physics

- Wave particle dualism
- Tunnelling
- Schrödinger equation
- H-atom

2) Electrical conductivity of solids

- solid state: periodic potentials
- Pauli Principle
- band structure
- metals, semiconductors and isolators
- p-n junction / diode

3) Optics

- quantum mechanical principles of the laser
- linear optics
- non-linear optics

Exercises are used for complementing and deepening the contents of the lecture as well as for answering more extensive questions raised by the students and for testing progress in learning of the topics.

The student

- has the basic understanding of the physical foundations to explain the relationship between the quantum mechanical principles and the optical as well as electrical properties of materials
- can describe the fundamental experiments, which allow the illustration of these principles

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises)
self-study: 105 hours

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Organizational issues
Kontakt: daniel.weygand@kit.edu

Literature

- Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
- Haken und Wolf: Atom- und Quantenphysik. Einführung in die experimentellen und theoretischen Grundlagen, 7. Aufl., Springer, 2000
- Harris, Moderne Physik, Pearson Verlag, 2013

T 7.313 Course: Planning and Management of Industrial Plants [T-WIWI-102631]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2581952	Planning and Management of Industrial Plants	2 SWS	Lecture / 🗣	Schultmann, Rudi
WT 23/24	2581953	Übungen Anlagenwirtschaft	2 SWS	Practice / 🗣	Heck, Heinzmann
Exams					
WT 23/24	7981952	Planning and Management of Industrial Plants			Schultmann
ST 2024	7981952	Planning and Management of Industrial Plants			Schultmann

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Planning and Management of Industrial Plants

2581952, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.

During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.314 Course: Platform & Market Engineering: Commerce, Media, and Digital Democracy [T-WIWI-112823]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-101411 - Information Engineering
M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-102754 - Service Economics and Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2540460	Platform & Market Engineering: Commerce, Media, and Digital Democracy	2 SWS	Lecture / 🗣	Weinhardt, Fegert
ST 2024	2540461	Übungen zu Platform & Market Engineering: Commerce, Media, and Digital Democracy	1 SWS	Practice / 🗣	Fegert, Stano
Exams					
WT 23/24	7910804	Platform & Market Engineering: Commerce, Media, and Digital Democracy			Weinhardt

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by max. one grade level (0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Platform & Market Engineering: Commerce, Media, and Digital Democracy

2540460, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Organizational issues
ehemals: "**Market Engineering: Information in Institutions**"

Literature

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.
- Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
- Smith, V. "Theory, Experiments and Economics", The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

T 7.315 Course: PLM for Product Development in Mechatronics [T-MACH-102181]

Responsible: Prof. Dr.-Ing. Martin Eigner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
WT 23/24	2122376	PLM for product development in mechatronics	2 SWS	Lecture / 🗣	Eigner
ST 2024	2122376	PLM for product development in mechatronics	2 SWS	Lecture / 🗣	Eigner
Exams					
WT 23/24	76-T-MACH-102181	PLM for Product Development in Mechatronics			Eigner

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral examination 20 min.

Prerequisites
none

Below you will find excerpts from events related to this course:

V PLM for product development in mechatronics

2122376, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Students are able to

- compare product data management and product lifecycle management.
- describe the components and core functions of a PLM solution
- explain trends from research and practice in the field of PLM form mechatronic product development

Organizational issues
Blockveranstaltung, Zeit und Ort siehe Homepage oder ILIAS zur Lehrveranstaltung.

Literature
Vorlesungsfolien / lecture slides

V PLM for product development in mechatronics

2122376, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Students are able to

- compare product data management and product lifecycle management.
- describe the components and core functions of a PLM solution
- explain trends from research and practice in the field of PLM form mechatronic product development

Organizational issues
Blockveranstaltung, Teilnehmerzahl begrenzt.

Literature
Vorlesungsfolien / lecture slides

T 7.316 Course: Polymer Engineering I [T-MACH-102137]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2173590	Polymer Engineering I	2 SWS	Lecture / 🗣	Liebig
Exams					
WT 23/24	76-T-MACH-102137	Polymer Engineering I			Liebig
ST 2024	76-T-MACH-102137	Polymer Engineering I			Liebig

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

Below you will find excerpts from events related to this course:

V Polymer Engineering I

2173590, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Economical aspects of polymers
2. Introductiom of mechanical,
chemical end electrical properties
3. Processing of polymers
(introduction)
4. Material science of polymers
5. Synthesis

learning objectives:

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material "polymer" meeting its requirements in an economical and ecological way.

The students

- are able to describe and classify polymers
based on the fundamental synthesis processing techniques
- can find practical applications for state-of-the-art polymers and manufacturing technologies
- are able to apply the processing techniques, the application of polymers and polymer composites regarding to the basic principles of material science
- can describe the special mechanical, chemical and elctrical prooperties of polymers and correlate these properties to the chemical bindings.
- can define application areas and the limitation in the use of polymers

requirements:
none

workload:

regular attendance: 21 hours
self-study: 99 hours

Literature
Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.

T 7.317 Course: Polymer Engineering II [T-MACH-102138]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2174596	Polymer Engineering II	2 SWS	Lecture / 🗣	Liebig
Exams					
WT 23/24	76-T-MACH-102138	Polymerengineering II			Liebig
ST 2024	76-T-MACH-102138	Polymerengineering II			Liebig

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

Recommendation
Knowledge in Polymerengineering I

Below you will find excerpts from events related to this course:

V **Polymer Engineering II** — **Lecture (V) On-Site**
2174596, SS 2024, 2 SWS, Language: German, Open in study portal

Content
1. Processing of polymers
2. Properties of polymer components
Based on practical examples and components
2.1 Selection of material
2.2 Component design
2.3 Tool engineering
2.4 Production technology
2.5 Surface engineering
2.6 Sustainability, recycling

learning objectives:

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, that the students gather knowledge and technical skills to use the material "polymer" meeting its requirements in an economical and ecological way.

The students

- can describe and classify different processing techniques
  and can exemplify mould design principles based on technical parts.
- know about practical applications and processing of polymer parts
- are able to design polymer parts according to given restrictions
- can choose appropriate polymers based on the technical requirements
- can decide how to use polymers regarding the production, economical and ecological requirements

requirements:
Polymerengineering I
workload:

The workload for the lecture Polymerengineering II is 120 h per semester and consists of the presence during the lecture (21 h) as well as preparation and rework time at home (99 h).

Literature
Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.

Recommended literature and selected official lecture notes are provided in the lecture.

T 7.318 Course: Polymers in MEMS A: Chemistry, Synthesis and Applications [T-MACH-102192]

Responsible: Dr.-Ing. Bastian Rapp
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2141853	Polymers in MEMS A: Chemistry, Synthesis and Applications	2 SWS	/	Worgull
Exams					
WT 23/24	76-T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications			Rapp, Worgull
ST 2024	76-T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications			Rapp, Worgull

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V Polymers in MEMS A: Chemistry, Synthesis and Applications

2141853, WS 23/24, 2 SWS, Language: German, Open in study portal **Blended (On-Site/Online)**

Organizational issues
Findet als Blockveranstaltung am Semesterende statt.

T 7.319 Course: Polymers in MEMS B: Physics, Microstructuring and Applications [T-MACH-102191]

Responsible: Dr.-Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2141854	Polymers in MEMS B: Physics, Microstructuring and Applications	2 SWS	Lecture /	Worgull
Exams					
WT 23/24	76-T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications			Worgull
ST 2024	76-T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications			Worgull

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Polymers in MEMS B: Physics, Microstructuring and Applications**
2141854, WS 23/24, 2 SWS, Language: German, Open in study portal
Lecture (V)
Blended (On-Site/Online)

T 7.320 Course: Polymers in MEMS C: Biopolymers and Bioplastics [T-MACH-102200]

Responsible: Dr.-Ing. Bastian Rapp
Dr.-Ing. Matthias Worgull

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2142855	Polymers in MEMS C - Biopolymers and Bioplastics	2 SWS	/	Worgull
Exams					
WT 23/24	76-T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics			Worgull, Rapp
ST 2024	76-T-MACH-102200	Polymers in MEMS C: Biopolymers and Bioplastics			Worgull, Rapp

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V Polymers in MEMS C - Biopolymers and Bioplastics

2142855, SS 2024, 2 SWS, Language: German, Open in study portal

Blended (On-Site/Online)

Content
Polymers are ubiquitous in everyday life: from packaging materials all the way to specialty products in medicine and medical engineering. Today it is difficult to find a product which does not (at least in parts) consist of polymeric materials. The question of how these materials can be improved with respect to their disposal and consumption of (natural) resources during manufacturing is often raised. Today polymers must be fully recycled in Germany and many other countries due to the fact that they do not (or only very slowly) decompose in nature. Furthermore significant reductions of crude oil consumption during synthesis are of increasing importance in order to improve the sustainability of this class of materials. With respect to disposal polymers which do not have to be disposed by combustion but rather allow natural decomposition (composting) are of increasing interest. Polymers from renewable sources are also of interest for modern microelectromechanical systems (MEMS) especially if the systems designed are intended as single-use products.

This lecture will introduce the most important classes of these so-called biopolymers and bioplastics. It will also discuss and highlight polymers which are created from naturally created analogues (e.g. via fermentation) to petrochemical polymer precursors and describe their technical processing. Numerous examples from MEMS as well as everyday life will be given.

Some of the topics covered are:

- What are biopolyurethanes and how can you produce them from castor oil?
- What are "natural glues" and how are they different from chemical glues?
- How do you make tires from natural rubbers?
- What are the two most important polymers for life on earth?
- How can you make polymers from potatoes?
- Can wood be formed by injection molding?
- How do you make buttons from milk?
- Can you play music on biopolymers?
- Where and how do you use polymers for tissue engineering?
- How can you built LEGO with DNA?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

Organizational issues
Für weitere Rückfragen, wenden Sie sich bitte an PD Dr.-Ing- Matthias Worgull (matthias.worgull@kit.edu). Eine Voranmeldung ist nicht notwendig.

Literature
Zusätzliche vorlesungsbegleitende Literatur ist nicht notwendig.

T 7.321 Course: Portfolio and Asset Liability Management [T-WIWI-103128]

Responsible: Dr. Mher Safarian
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2520357	Portfolio and Asset Liability Management	2 SWS	Lecture	Safarian
ST 2024	2520358	Übungen zu Portfolio and Asset Liability Management	2 SWS	Practice	Safarian

Competence Certificate
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Portfolio and Asset Liability Management

2520357, SS 2024, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
Learning objectives:

Knowledge of various portfolio management techniques in the financial industry.

Content:

Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

Exam preparation: 40 hours

Exam preparation: 40 hours

Organizational issues
Blockveranstaltung, Termine werden über Ilias bekanntgegeben

Literature
To be announced in the lecture

T 7.322 Course: Power Transmission and Power Network Control [T-ETIT-101941]

Responsible: Prof. Dr.-Ing. Thomas Leibfried
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101164 - Generation and Transmission of Renewable Power

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2024	2307372	Power Transmission and Power Network Control	2 SWS	Lecture / 🗣	Leibfried
ST 2024	2307374	Übungen zu 2307372 Energieübertragung und Netzregelung	1 SWS	Practice / 🗣	Bisseling
Exams					
WT 23/24	7307372	Power Transmission and Power Network Control			Leibfried
ST 2024	7307372	Power Transmission and Power Network Control			Leibfried

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.323 Course: Practical Course in Water Technology [T-CIWVT-106840]

Responsible: Dr. Gudrun Abbt-Braun
Dr. Andrea Hille-Reichel
Prof. Dr. Harald Horn

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101121 - Water Chemistry and Water Technology I

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	3

Events					
WT 23/24	2233032	Practical Course: Water Quality and Water Assessment	2 SWS	Practical course / 🗣	Horn, Abbt-Braun
Exams					
WT 23/24	7232664	Practical Course in Water Technology			Horn, Abbt-Braun, Hille-Reichel
ST 2024	7232664	Practical Course in Water Technology			Horn, Abbt-Braun, Hille-Reichel

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The learning: 6 Experiments including entrance test, protocol; presentation about a selected experiment (about 15 minutes); final test (SPO section 4, subsection 2 No. 3).

Prerequisites
None

T 7.324 Course: Practical Course Polymers in MEMS [T-MACH-105556]

Responsible: Dr.-Ing. Bastian Rapp
Dr.-Ing. Matthias Worgull

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	3	pass/fail	Each summer term	1

Events					
ST 2024	2142856	Practical Course Polymers in MEMS	2 SWS	Block /	Worgull

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The practical course will close with an oral examination.There will be only passed and failed results, no grades.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Practical Course Polymers in MEMS

2142856, SS 2024, 2 SWS, Language: German, Open in study portal

Block (B)
Blended (On-Site/Online)

Content
This practical course complements the lectures "Polymers in MEMS A", "Polymers in MEMS B" and "Polymers in MEMS C" and will allow students to gain a deeper understanding of polymers and their processing. During the course of this practical course, various polymers will be synthesized and molded into components suitable for microelectromechanical systems (MEMS) applications. The aim of the course is to bring a polymer all the way from synthesis to application.

The practical course will be given in German language unless non-German speaking students attend. In this case, the course will be given in English (with some German translations of technical vocabulary). Lecture notes for the experiments are in English language and will be handed out to the students. The practical course will be held "en block" at the end of the semester (presumably beginning of October)

For further details, please contact PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is mandatory. The number of participants is limited to 5 students.

Organizational issues
Anmeldung und Terminabsprache in der Vorlesung (2142855)

Für weitere Rückfragen, wenden Sie sich bitte an PD Dr.-Ing- Matthias Worgull (matthias.worgull@kit.edu). Eine Voranmeldung ist notwendig. Die Platzanzahl ist auf 5 Teilnehmer beschränkt.

Literature
Vorlesungsunterlagen, dort empfohlene Literatur

T 7.325 Course: Practical Course Technical Ceramics [T-MACH-105178]

Responsible: apl. Prof. Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	4	pass/fail	Each winter term	2

Events					
WT 23/24	2125751	Practical Course Technical Ceramics	2 SWS	Practical course / 🗣	Schell
Exams					
WT 23/24	76-T-MACH-105178	Practical Course Technical Ceramics			Schell

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Colloquium and laboratory report for the respective experiments.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Practical Course Technical Ceramics

2125751, WS 23/24, 2 SWS, Language: German, Open in study portal

Practical course (P)
On-Site

Organizational issues
Elektronisch über das ILIAS-Portal

Literature
Salmang, H.: Keramik, 7. Aufl., Springer Berlin Heidelberg, 2007. - Online-Ressource

Richerson, D. R.: Modern Ceramic Engineering, CRC Taylor & Francis, 2006

T 7.326 Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	1

Events					
WT 23/24	2540554	Practical Seminar: Information Systems & Service Design	3 SWS	Lecture /	Mädche
Exams					
WT 23/24	7900341	Practical Seminar: Information Systems and Service Design			Mädche
ST 2024	7900262	Practical Seminar: Human-Centered Systems			Mädche
ST 2024	7900307	Service Design Thinking			Satzger
ST 2024	7900312	Practical Seminar Service Innovation			Satzger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendation
None

Annotation
New course title starting summer term 2017: "Practical Seminar Digital Service Systems".
The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

Below you will find excerpts from events related to this course:

V Practical Seminar: Information Systems & Service Design

2540554, WS 23/24, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

T 7.327 Course: Practical Seminar: Advanced Analytics [T-WIWI-108765]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103118 - Data Science: Data-Driven User Modeling

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Competence Certificate
The assessment consists of practical work in the field of advanced analytics, a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendation
At least one module offered by the institute should have been chosen before attending this seminar.

Annotation
The course is held in English. The course is not offered regularly.

T 7.328 Course: Practical Seminar: Artificial Intelligence in Service Systems [T-WIWI-112152]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101506 - Service Analytics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	1

Exams			
ST 2024	7900312	Practical Seminar Service Innovation	Satzger

Competence Certificate
The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

Prerequisites
None.

Recommendation
Knowledge in the field of Artificial Intelligence in Service Systems is assumed. Therefore, it is recommended to attend the course Artificial Intelligence in Service Systems [2595650] beforehand.

T 7.329 Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	1

Competence Certificate
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendation
At least one module offered by the institute should have been chosen before attending this seminar.

Annotation
The course is held in english. The course is not offered regularly.

T 7.330 Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
WT 23/24	2500008	Practical seminar: Health Care Management	3 SWS	Others (sons / 🗣)	Nickel, Mitarbeiter
ST 2024	2550498	Practical seminar: Health Care Management	3 SWS	Seminar / 🏵	Nickel, Mitarbeiter
Exams					
WT 23/24	7900105	Practical Seminar: Health Care Management (with Case Studies)			Nickel

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Due to a research semester of Professor Nickel in WS 19/20, the courses *Location Planning and Strategic SCM* and *Practice Seminar: Health Care Management* do NOT take place in WS 19/20. Please also refer to the information at https://dol.ior.kit.edu/Lehrveranstaltungen.php for further details.

The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

Prerequisites
None.

Recommendation
Basic knowledge as conveyed in the module *Introduction toOperations Research* is assumed.

Annotation
The credits have been reduced to 4,5 starting summer term 2016.

The lecture is offered every term.

The planned lectures and courses for the next three years are announced online.

T 7.331 Course: Practical Seminar: Human-Centered Systems [T-WIWI-113459]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	1

Events					
ST 2024	2540554	Practical Seminar: Human-Centered Systems	3 SWS	Lecture /	Mädche
Exams					
ST 2024	7900262	Practical Seminar: Human-Centered Systems			Mädche

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment of this course is in the form of a different type of examination. The assessment is carried out by a practical component, preparing written documentation and actively participating in the discussions. A total of 60 points can be achieved, of which:

- a maximum of 25 points for the written documentation
- a maximum of 25 points for the practical component
- a maximum of 10 points for active participation in the discussions

At least 30 points must be achieved to pass the performance assessment. Please note that a practical component such as conducting a survey or implementing an application is also part of the regular scope of the course in addition to the written documentation. The respective tasks can be found in the announcement on the institute's website https://h-lab.iism.kit.edu.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-108437 - Practical Seminar: Information Systems and Service Design must not have been started.

Below you will find excerpts from events related to this course:

V Practical Seminar: Human-Centered Systems

2540554, SS 2024, 3 SWS, Language: English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
In this practical seminar, students get an individual assignment and develop a running software prototype. Beside the software prototype, the students also deliver a written documentation.

Please find the current open offerings on our website: https://h-lab.iism.kit.edu/thesis.php

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

T 7.332 Course: Practical Seminar: Service Innovation [T-WIWI-110887]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-102806 - Service Innovation, Design & Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	1

Exams			
ST 2024	7900307	Service Design Thinking	Satzger
ST 2024	7900312	Practical Seminar Service Innovation	Satzger

Competence Certificate
Success is assessed through the preparation of written documentation, a presentation of the results of the practical components carried out and active participation in the discussions (in accordance with §4(2), 3 SPO).

Please note that a practical component such as conducting a survey or implementing an application is also part of the regular scope of the course in addition to the written documentation. Please refer to the course description for the respective tasks.

The overall grade is made up of the weighted components (e.g. documentation, oral presentation, practical work and active participation). The weighting of these components for the grade will be announced at the beginning of the course.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-105774 - Practical Seminar: Digital Service Design must not have been started.
2. The course T-WIWI-102799 - Practical Seminar Service Innovation must not have been started.

Recommendation
Knowledge of Service Innovation Methods is assumed. Therefore it is recommended (but not mandatory) to attend the course Service Innovation [2540468] beforehand.

Annotation
Due to the project work, the number of participants is limited and participation requires knowledge about models, concepts and approaches that are taught in the Service Innovation lecture. Having taken the Service Innovation lecture or demonstrating equivalent knowledge is a prerequisite for participating in this Practical Seminar. Details for registration will be announced on the web pages for this course.

The seminar is not offered regularly.

T 7.333 Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-ETIT-101158 - Sensor Technology I
M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS
M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics
M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
WT 23/24	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
ST 2024	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course / 🗣	Last
Exams					
WT 23/24	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology			Last

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Introduction to Microsystem Technology - Practical Course** — **Practical course (P) On-Site**
2143875, WS 23/24, 2 SWS, Language: German, Open in study portal

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V **Introduction to Microsystem Technology - Practical Course** — **Practical course (P) On-Site**
2143877, WS 23/24, 2 SWS, Language: German, Open in study portal

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

V **Introduction to Microsystem Technology - Practical Course** — **Practical course (P) On-Site**
2143875, SS 2024, 2 SWS, Language: German, Open in study portal

Content
In the practical training includes ten experiments:

1. Röntgenoptik
2. UVL + REM
3. Mischerbauteil
4. Rasterkraftmikroskopie
5. 3D-Printing
6. Lichtstreuung an Chrommasken
7. Abformung
8. SAW-Biosensorik
9. Nano3D-Drucker - Materialtransfer dünnster Schichten
10. Elektrospinning

Each student takes part in only four experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Organizational issues
Das Praktikum findet in den Laboren des IMT am CN statt. Treffpunkt: Bau 301, vor dem Eingang.

Teilnahmeanfragen an arndt.last@kit.edu

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 7.334 Course: Predictive Mechanism and Market Design [T-WIWI-102862]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101505 - Experimental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
WT 23/24	2520402	Predictive Mechanism and Market Design	2 SWS	Lecture	Reiß

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Annotation
The course is given every second fall term, e.g., WS2017/18, WS2019/20, ...

The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.

T 7.335 Course: Predictive Modeling [T-WIWI-110868]

Responsible: Prof. Dr. Fabian Krüger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	2

Events					
ST 2024	2521311	Predictive Modeling	2 SWS	Lecture / 🗣	Krüger, Koster
ST 2024	2521312	Predictive Modeling (Tutorial)	2 SWS	Practice / 🗣	Koster, Krüger
Exams					
WT 23/24	7900014	Predictive Modeling			Krüger

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (90 minutes) according to §4(2), 1 of the examination regulation. A bonus can be acquired by successful completion of an assignment (written report + short in-class presentation) during the semester. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Predictive Modeling

2521311, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Contents

This course presents methods for making and evaluating statistical predictions based on data. We consider various types of predictions (mean, probability, quantile, and full distribution), all of which are practically relevant. In each case, we discuss selected modeling approaches and their implementation using R software. We consider various economic case studies. Furthermore, we present methods for absolute evaluation (assessing whether a given model is compatible with the data) and relative evaluation (comparing the predictive performance of alternative models).

Learning objectives
Students have a good conceptual understanding of statistical prediction methods. They are able to implement these methods using statistical software, and can assess which method is suitable in a given situation.

Prerequisites

Students should know econometrics on the level of the course `Applied Econometrics' [2520020]

Literature

- Elliott, G., und A. Timmermann (Hrsg.): "Handbook of Economic Forecasting", vol. 2A und 2B, 2013.
- Gneiting, T., und M. Katzfuss: "Probabilistic Forecasting", Annual Review of Statistics and Its Application 1, 125-151, 2014.
- Hastie, T., Tibshirani, R., and J. Friedman: "The Elements of Statistical Learning", 2. Ausgabe, Springer, 2009.
- Weitere Literatur wird in der Vorlesung bekanntgegeben.

V Predictive Modeling (Tutorial)

2521312, SS 2024, 2 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

T 7.336 Course: Price Management [T-WIWI-105946]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101409 - Electronic Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2540529	Price Management	2 SWS	Lecture / 🗣	Glenn
ST 2024	2540530	Exercise Price Management	1 SWS	Practice / 🗣	Glenn
Exams					
WT 23/24	7900170	Price Management (Nachklausur SS 2023)			Geyer-Schulz
ST 2024	7900139	Price Management			Geyer-Schulz

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Lecture and exam will not be offered in summer semester 2019. The next examination is in the summer semester 2020.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The lecture is offered for the first time in summer term 2016.

Below you will find excerpts from events related to this course:

V Price Management

2540529, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Termine:

Samstags von 9:00 - 19:00 Uhr

18.05.2024 => Termin 1

08.06.2024 => Termin 2

29.06.2024 => Termin 3
20.07.2024 => Termin 4

Literature

- H. Simon and M. Fassnacht, *Preismanagement*, vol. 4. Wiesbaden: Springer Gabler, 2016.
- T. T. Nagle, J. E. Hogan, und J. Zalee, *The Strategy and Tactics of Pricing: A guide to growing more profitably*. New Jersey: Prentice Hall, 2010.

T 7.337 Course: Pricing [T-WIWI-102883]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2572199	Pricing	3 SWS	Block / 🗣	Bill, Klarmann, Schröder
Exams					
WT 23/24	7900343	Pricing			Klarmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment. The examination (and thus the grade) is composed of three parts:

1. The design and execution of your own small experimental study around the topic of behavioral pricing (as group work).
2. The processing and presentation of a case study on pricing (as group work).
3. The execution of a simulated price negotiation based on a systematic preparation (usually in teams of two).

Prerequisites
Since the earlier course (a) "Pricing Excellence" and (b) "Price Negotiations and Sales Presentations" become parts of the Pricing course, Pricing cannot be taken if (a) and/or (b) have already been completed.

Recommendation
Students are highly encouraged to actively participate in class.

Annotation
A small application is required for participation in this class. The application phase usually takes place at the beginning of the lecture period in the winter semester. More information on the application process will be made available on the Marketing and Sales Research Group website (marketing.iism.kit.edu) shortly before the start of the winter semester lecture period. This course is limited to 24 participants.

Below you will find excerpts from events related to this course:

V **Pricing** **Block (B) On-Site**
2572199, WS 23/24, 3 SWS, Language: English, Open in study portal

Content
At the Pricing lecture, students learn about current research and best practices in price management. Delivered in workshop format, the lecture has three key elements:

1. "Behavioral Pricing" workshop
   In this part of the course, central concepts and findings from behavioral pricing research (e.g. price information processing, reference prices, price fairness and mental accounting) are presented and discussed on the basis of important behavioral theories (e.g. prospect theory and information economics). After a brief introduction to experimental research, participants will then conduct their own small experimental study in the form of group work on a hypothesis they have developed on pricing behavior, analyze the data, and present it.

2. "Pricing Excellence" workshop
   In a theory section at the beginning of the course, students are taught theoretical principles of pricing. This includes an introduction to (1) pricing of product prices as well as (2) pricing of net customer prices (development of discount systems). Furthermore, theoretical basics of price enforcement and price monitoring are discussed. This will be followed by a practical application of what has been learned by working on a case study in small groups with a concluding presentation.

3. "Price Negotiation" workshop
   After an introduction to key theories and concepts of negotiation, students prepare and then conduct a simulated price negotiation in small groups with guidance.

Learning Objectives:

Students...

- are familiar with central theories explaining behavioral phenomena regarding consumers dealing with prices
- are able to describe and explain central phenomena of behavioral science with regard to price behavior and derive implications from them
- can formulate their own hypotheses on price behavior and design, conduct and evaluate a suitable experimental study for this purpose
- learn theoretical basics of pricing behavior
- learn the theoretical basics of price enforcement and price monitoring
- apply the acquired knowledge in a practical case study
- know important conceptual basics on the subject of price negotiations
- can prepare and competently conduct price negotiations
- present the results of their group work in a concise and structured manner

All events will take place in presence with compulsory attendance at all dates.

Total time required for 4.5 credit points: approx. 135 hours

Attendance time: 30 hours

Self-study: 105 hours

Organizational issues
Dates will be announced.

T 7.338 Course: Principles of Ceramic and Powder Metallurgy Processing [T-MACH-102111]

Responsible: apl. Prof. Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2193010	Basic principles of powder metallurgical and ceramic processing	2 SWS	Lecture /	Schell
Exams					
WT 23/24	76-T-MACH-102111	Principles of Ceramic and Powder Metallurgy Processing			Schell, Wagner
ST 2024	76-T-MACH-102111	Principles of Ceramic and Powder Metallurgy Processing			Schell

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The assessment consists of an oral exam (20-30 min) taking place at the agreed date. The re-examination is offered upon agreement.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Basic principles of powder metallurgical and ceramic processing

2193010, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Literature

- R.J. Brook: Processing of Ceramics I+II, VCH Weinheim, 1996
- M.N. Rahaman: Cermamic Processing and Sintering, 2nd Ed., Marcel Dekker, 2003
- W. Schatt ; K.-P. Wieters ; B. Kieback. ".Pulvermetallurgie: Technologien und Werkstoffe", Springer, 2007
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
- F. Thümmler, R. Oberacker. "Introduction to Powder Metallurgy", Institute of Materials, 1993

T 7.339 Course: Probabilistic Time Series Forecasting Challenge [T-WIWI-111387]

Responsible: Prof. Dr. Fabian Krüger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Irregular	2

Events					
WT 23/24	2500080	Probabilistic Time Series Forecasting Challenge	2 SWS	Practice /	Bracher, Koster, Lerch
WT 23/24	2500081	Probabilistic Time Series Forecasting Challenge		Project (P /	Bracher, Koster, Lerch
Exams					
WT 23/24	7900025	Probabilistic Time Series Forecasting Challenge			Krüger, Lerch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Alternative exam assessment. Necessary conditions to pass the course:

1. Weekly submission of statistical forecasts during the semester (excluding the Christmas break),
2. Submission of a final report (10-15 pages) at the end of the semester, describing the forecasting methods and their statistical evaluation.

Grading is based on the final report.

Prerequisites
Good methodological knowledge in statistics and data science.
Good knowledge in applied data analysis, incl. programming skills in R, Python or similar.
Knowledge of time series analysis is helpful, but not required.

Annotation
The course is limited in participation. Participants will be selected via the WIWI portal.

Below you will find excerpts from events related to this course:

V Probabilistic Time Series Forecasting Challenge

2500081, WS 23/24, SWS, Language: English, Open in study portal

Project (PRO)
Blended (On-Site/Online)

Content
Statistical forecasts are relevant across all fields of society. In this data science project, students make, evaluate and communicate their own statistical forecasts in a real-time setting. We consider probabilistic forecasts that involve a measure of uncertainty in addition to a point forecast. Students are asked to make forecasts of several real-world time series (including weather variables and the DAX stock market index). Historical data on all series are available from public sources that are updated as time proceeds. While the time series differ from each other in important ways, statistical methods can meaningfully be used for prediction in all cases. We focus on quantile forecasts which are useful to measure forecast uncertainty in a relatively simple way.

Organizational issues
Short description

In this data science project, students make and evaluate statistical forecasts in a realistic setup (involving real-time predictions and real-world time series data). A kick-off meeting will take place in mid October. During the semester, there will be a weekly meeting in which students and instructors discuss the current state of the forecasting challenge.

Prerequisites

Students should have a good working knowledge of statistics and data science, including proficiency in a programming language like R, Python, or Matlab. Knowledge of time series analysis is helpful but not strictly required. Motivation and curiosity are particularly important in this course format that requires regular, active participation over the whole semester.

Please note that the number of participants is limited due to the interactive course format. Application takes place via the Wiwi portal, where further information is available.

Examination rules

The project seminar counts for 4.5 credit points (Leistungspunkte). Examination is via an alternative exam assessment (§4(2), 3 SPO). Necessary conditions to pass the course: 1) Weekly submission of statistical forecasts during the semester (excluding the Christmas break), 2) Submission of a final report (10-15 pages) at the end of the semester, describing the forecasting methods and their statistical evaluation. Grading is based on the final report.

T 7.340 Course: Process Engineering [T-BGU-101844]

Responsible: Dr.-Ing. Harald Schneider
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6241703	Verfahrenstechnik	2 SWS	Lecture / 🗣	Schneider
Exams					
WT 23/24	8240101844	Process Engineering			Schneider

Legend: 📱 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.341 Course: Process Engineering: Example Food Processing [T-CIWVT-111536]

Responsible: PD Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Grading scale	Version
Oral examination	6	Grade to a third	1

Events					
WT 23/24	2211110	Verfahrenstechnische Grundlagen am Beispiel der Lebensmittelverarbeitung (für LmCh, WiWi)	2 SWS	Lecture / 🗣	Gaukel
ST 2024	2211111	Vertiefung verfahrenstechnischer Grundlagen am Beispiel Lebensmittel	2 SWS	Lecture / 🗣	Gaukel
Exams					
ST 2024	7220027	Process Engineering: Example Food Processing			Gaukel

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.342 Course: Process Mining [T-WIWI-109799]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2511204	Process Mining	2 SWS	Lecture / 🗣	Oberweis
ST 2024	2511205	Exercise Process Mining	1 SWS	Practice / 🗣	Oberweis, Schreiber, Schüler, Rybinski
Exams					
WT 23/24	79AIFB_PM_A5	Process Mining			Oberweis
ST 2024	79AIFB_PM_C2	Process Mining (Registration until 15 July 2024)			Oberweis

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Annotation
Former name (up to winter semester 2018/1019) "Workflow Management".

Below you will find excerpts from events related to this course:

V **Process Mining** — **Lecture (V) On-Site**
2511204, SS 2024, 2 SWS, Language: German, Open in study portal

Content
The area of process mining covers approaches which aim at deducting new knowledge on the basis of logfiles generated by information systems. Such information systems are e.g., workflow-management-systems which are used for an efficient control of processes in enterprises and organisations. The lecture introduces the foundations of processes and respective modeling and analysis techniques. In the following, the foundations of process mining and the three classical types of approaches - discovery, conformance and enhancement - will be taught. In addition to the theoretical basics, tools, application scenarios in practice and open research questions are covered as well.

Learning objectives:

Students

- understand the concepts and approaches of process mining and know how they are applied,
- create and evaluate business process models,
- analyze static and dynamic properties of workflows,
- apply approaches and tools of process mining.

Recommendations:

Knowledge of course Applied Informatics - Modelling is expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- W. van der Aalst, H. van Kees: Workflow Management: Models, Methods and Systems, Cambridge, The MIT Press, 2002.
- W. van der Aalst: Process Mining: Data Science in Action. Springer, 2016.
- J. Carmona, B. van Dongen, A. Solti, M. Weidlich: Conformance Checking: Relating Processes and Models. Springer, 2018.
- A. Drescher, A. Koschmider, A. Oberweis: Modellierung und Analyse von Geschäftsprozessen: Grundlagen und Übungsaufgaben mit Lösungen. De Gruyter Studium, 2017.
- A. Oberweis: Modellierung und Ausführung von Workflows mit Petri-Netzen. Teubner-Reihe Wirtschaftsinformatik, B.G. Teubner Verlag, 1996.
- R. Peters, M. Nauroth: Process-Mining: Geschäftsprozesse: smart, schnell und einfach, Springer, 2019.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer, 2012.
- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer, 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.343 Course: Product and Innovation Management [T-WIWI-109864]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101514 - Innovation Economics
M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	3

Exams			
WT 23/24	7900055	Product and Innovation Management	Klarmann

Competence Certificate
The assessment of success takes place through a written exam with additional aids in the sense of an open book exam. Further details will be announced during the lecture.

Prerequisites
None

Annotation
For further information, please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

T 7.344 Course: Product- and Production-Concepts for Modern Automobiles [T-MACH-110318]

Responsible: Dr. Stefan Kienzle
Dr. Dieter Steegmüller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture /	Steegmüller, Kienzle
Exams					
WT 23/24	76-T-MACH-110318	Product- and Production-Concepts for modern Automobiles			Steegmüller, Kienzle

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Oral Exam (20 min)

Prerequisites
T-MACH-105166 - Materials and Processes for Body Leightweight Construction in the Automotive Industry must not have been started.

Below you will find excerpts from events related to this course:

V Product- and Production-Concepts for modern Automobiles

2149670, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
The lecture illuminates the practical challenges of modern automotive engineering. As former leaders of the automotive industry, the lecturers refer to current aspects of automotive product development and production.

The aim is to provide students with an overview of technological trends in the automotive industry. In this context, the course also focuses on changes in requirements due to new vehicle concepts, which may be caused by increased demands for individualisation, digitisation and sustainability. The challenges that arise in this context will be examined from both a production technology and product development perspective and will be illustrated with practical examples thanks to the many years of industrial experience of both lecturers.

The topics covered are:

- General conditions for vehicle and body development
- Integration of new drive technologies
- Functional requirements (crash safety etc.), also for electric vehicles
- Development Process at the Interface Product & Production, CAE/Simulation
- Energy storage and supply infrastructure
- Aluminium and lightweight steel construction
- FRP and hybrid parts
- Battery, fuel cell and electric motor production
- Joining technology in modern car bodies
- Modern factories and production processes, Industry 4.0.

Learning Outcomes:

The students …

- are able to name the presented general conditions of vehicle development and are able to discuss their influences on the final product using practical examples.
- are able to name the various lightweight approaches and identify possible areas of application.
- are able to identify the different production processes for manufacturing lightweight structures and explain their functions.
- are able to perform a process selection based on the methods and their characteristics.

Workload:

regular attendance: 25 hours
self-study: 95 hours

Organizational issues
Termine werden über Ilias bekannt gegeben.

Bei der Vorlesung handelt es sich um eine Blockveranstaltung. Eine Anmeldung über Ilias ist erforderlich.

Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The lecture is a block course. An application in Ilias is mandatory.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.345 Course: Production and Logistics Management [T-WIWI-102632]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each summer term	1

Events					
ST 2024	2581954	Production and Logistics Management	2 SWS	Lecture / 🗣	Schultmann, Rudi
ST 2024	2581955	Production and Logistics Managment	2 SWS	Practice / 🗣	Treml
Exams					
WT 23/24	7981954	Production and Logistics Management			Schultmann
ST 2024	7981954	Production and Logistics Management			Schultmann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Production and Logistics Management

2581954, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This course covers central tasks and challenges of operative production and logistics management. Students get to know the set-up and mode of planning systems such as production planning and control systems, enterprise resource planning systems and advanced planning systems to cope with the accompanying planning tasks in supply chain management. Methods to solve these tasks from the field of operational research will be explored with respect to manufacturing program planning, material requirement planning, lot size problems and scheduling. Alongside to MRP II (Manufacturing Resources Planning), students will be introduced to integrated supply chain management approaches. Finally, commercially available planning systems will be presented and discussed.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.346 Course: Production Technology for E-Mobility [T-MACH-110984]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	2

Events					
ST 2024	2150605	Production Technology for E-Mobility	2 SWS	Lecture / 🗣	Fleischer
Exams					
WT 23/24	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer
ST 2024	76-T-MACH-110984	Production Technology for E-Mobility			Fleischer

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Production Technology for E-Mobility

2150605, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
In the lecture Production Engineering for Electromobility the students should be enabled to design, select and develop production processes for the production of the components of an electric drive train (electric motor, battery cells, fuel cells) by using research-oriented teaching.

Learning Outcomes:

The students are able to:

- describe the structure and function of a fuel cell, an electric traction drive and a batterysystem.
- reproduce the process chains for the production of the components fuel cell, battery and electric traction drive.
- apply methodical tools to solve problems along the process chain.
- derive the challenges in the production of electric drives for electric mobility.
- describe the factors influencing the individual process steps on each other using the process chain of Li-ion battery cells.
- enumerate or describe the necessary process parameters to counteract the influencing factors of the process steps in Li-ion battery cell production.
- apply methodical tools to solve problems along the process chain for the production of Li-ion battery cells.
- derive the challenge of mounting and dismounting battery modules.
- derive the challenges in the production of fuel cells for use in mobility.

Workload:

regular attendance: 42 hours
self-study: 78 hours

Organizational issues
Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

T 7.347 Course: Project Development with Case Study [T-BGU-111217]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	1,5	Grade to a third	Each term	1 terms	1

Events					
WT 23/24	6242904	Projectdevelopment with Case Study	1 SWS	Lecture / 🗣	Lennerts, Mitarbeiter/innen

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.348 Course: Project Internship Additive Manufacturing: Development and Production of an Additive Component [T-MACH-110960]

Responsible: Prof. Dr.-Ing. Frederik Zanger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each winter term	2

Events					
WT 23/24	2149700	Project Internship Aditive Manufacturing: Development and Production of an Additive Component	2 SWS	Practical course / 🗣	Zanger, Frey
Exams					
WT 23/24	76-T-MACH-110960	Project Internship Aditive Manufacturing: Development and Production of an Additive Component			Zanger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative test achievement (graded)

The competence certificate is a project work; alternative test achievement according to § 4 Abs. 2 No. 3 of the SPO. Here, the project work, the milestone-based presentation of the results in presentation form (10 min each) and a final oral examination (15 min) are included in the assessment.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Project Internship Aditive Manufacturing: Development and Production of an Additive Component

Practical course (P)
On-Site

2149700, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
The lecture "Project Internship Additive Manufacturing: Development and Production of an Additive Component" combines the basics of metallic laser powder bed fusion (LPBF) with a development project in cooperation with an industrial company.
The students learn the basics of the following topics in the project-related lecture:

- Influence of different process variables on the component quality of parts produced in the LPBF process
- Preparation and simulation of the LPBF process
- Production of additive metallic components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- CAM for subtractive rewor

The topics addressed in the course will be applied practically in various workshops on the individual topics and transferred to the developmental task in self-study.
Finally, the results of the elaborations are produced additively and post-processed subtractively.

Learning Outcomes:

The students …

- are able to describe the properties and applications of the additive manufacturing processes laser powder bed fusion (LPBF).
- are able to select the appropriate manufacturing process for a technical application.
- are able to describe and implement the creation of a product along the entire additive process chain (CAD, simulation, work preparation, CAM) from the idea to the production.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- are able to perform topology optimization.
- are able to simulate the additive process, compensate for process-related distortions and determine the ideal alignment on the building platform.
- are able to create necessary support structures for the additive process and to derive a building order file.
- are able to create a CAM model for the subtractive rework process of additive parts.

Workload:

regular attendance: 12 hours
self-study: 108 hours

Organizational issues
Die Veranstaltung beginnt mit einer Blockveranstaltung vor Semesterbeginn. Während des Semesters finden nur einzelne Pflichtveranstaltungen statt. Die genauen Termine werden über die Vorlesungsankündigung des wbk mitgeteilt: http://www.wbk.kit.edu/studium-und-lehre.php

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Der Link zur Bewerbung wird in der Vorlesungsankündigung über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php) zur Verfügung gestellt.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

T 7.349 Course: Project Lab Cognitive Automobiles and Robots [T-WIWI-109985]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each winter term	3

Events					
WT 23/24	2512501	Practical Course Cognitive automobiles and robots (Master)	3 SWS	Practical course /	Zöllner, Daaboul
Exams					
WT 23/24	7900107	Advanced Lab Cognitive Automobile and Robots (Master)			Zöllner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Practical Course Cognitive automobiles and robots (Master)

2512501, WS 23/24, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to courses such as "Machine Learning 1/2".
Scientific topics, mostly in the area of autonomous driving and robotics, will be addressed in joint work with ML/KI methods. The goal of the internship is for participants to design, develop, and evaluate ML Software system.

In addition to the scientific goals, such as the study and application of methods, the aspects of project-specific teamwork in research (from specification to presentation of results) are also worked on in this internship.

The individual projects require the analysis of the set task, selection of appropriate methods, specification and implementation and evaluation of the solution approach. Finally, the selected solution is to be documented and presented in a short lecture.

Learning Objectives:

- Students will be able to practically apply theoretical knowledge from lectures on machine learning to a selected area of current research.
- Students will be proficient in analyzing and solving thematic problems.
- Students will be able to evaluate, document, and present their concepts and results.

Recommendations:

- Theoretical knowledge of machine learning and/or AI.
- Python knowledge
- Initial experience with deep learning frameworks such as PyTorch/Jax/Tensorflow may be beneficial.

Workload:

The workload of 5 credit points consists of practical implementation of the selected solution, as well as time for literature research and planning/specification of the selected solution. In addition, a short report and presentation of the work performed will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

T 7.350 Course: Project Lab Machine Learning [T-WIWI-109983]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each summer term	3

Events					
ST 2024	2512500	Project Lab Machine Learning	3 SWS	Practical course /	Daaboul, Zöllner, Schneider
Exams					
ST 2024	7900086	Project Lab Machine Learning			Zöllner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Project Lab Machine Learning

2512500, SS 2024, 3 SWS, Language: German/English, Open in study portal

Practical course (P)
Blended (On-Site/Online)

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:

The workload of 5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.

T 7.351 Course: Project Management [T-WIWI-103134]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2581963	Project Management	2 SWS	Lecture / 🗣	Schultmann, Volk
Exams					
WT 23/24	7981963	Project Management			Schultmann
ST 2024	7981963	Project Management			Schultmann

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Project Management

2581963, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management
8. Stakeholder
9. Communication, Negotiation and Leadership
10. Project Controlling
11. Agile Project Management

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.352 Course: Project Management in Construction and Real Estate Industry I [T-BGU-103432]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	2

Events					
WT 23/24	6241701	Projektmanagement in der Bau- und Immobilienwirtschaft	4 SWS	Lecture / Practice (/ 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 23/24	8240103432	Project Management in Construction and Real Estate Industry I			Haghsheno

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
see German version

Prerequisites
none

Recommendation
none

Annotation
none

T 7.353 Course: Project Management in Construction and Real Estate Industry II [T-BGU-103433]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	2

Events					
WT 23/24	6241701	Projektmanagement in der Bau- und Immobilienwirtschaft	4 SWS	Lecture / Practice (/ 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 23/24	8240103433	Project Management in Construction and Real Estate Industry II			Haghsheno

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
see German version

Prerequisites
Project Management in Construction and Real Estate Industry I (T-BGU-103432) has to be passed.

Recommendation
none

Annotation
none

T 7.354 Course: Project Paper Lean Construction [T-BGU-101007]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	1,5	Grade to a third	Each winter term	1

Events					
WT 23/24	6241901	Lean Construction	4 SWS	Lecture / Practice (/ 🗣	Haghsheno, Mitarbeiter/innen
Exams					
WT 23/24	8246101007	Project paper Lean Construction			Haghsheno

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
project:

report, appr. 10 pages, and
presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.355 Course: Project Studies [T-BGU-101847]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6243801	Project Studies	2 SWS	Lecture / Practice (/ 🗣	Haupenthal, Gentes
Exams					
WT 23/24	8240101847	Project Studies			Gentes
ST 2024	8240101847	Project Studies			Gentes

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.356 Course: Project Workshop: Automotive Engineering [T-MACH-102156]

Responsible: Dr.-Ing. Michael Frey
Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles
M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	Each term	1

Events					
WT 23/24	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture / 🗣	Gauterin, Gießler, Frey
ST 2024	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture / 🗣	Gauterin, Gießler, Frey
Exams					
WT 23/24	76-T-MACH-102156	Project Workshop: Automotive Engineering			Gauterin

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Project Workshop: Automotive Engineering

2115817, WS 23/24, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Learning Objectives:

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Organizational issues
Begrenzte Teilnehmerzahl mit Auswahlverfahren, in deutscher Sprache. Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.
Termin und Raum: siehe Institutshomepage.

Limited number of participants with selection procedure, in German language. Please send the application at the end of the previous semester

Date and room: see homepage of institute.

Literature
Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

Skripte werden beim Start-up Meeting ausgegeben.

The scripts will be supplied in the start-up meeting.

V

Project Workshop: Automotive Engineering

2115817, SS 2024, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Learning Objectives:

The students are familiar with typical industrial development processes and working style. They are able to apply knowledge gained at the university to a practical task. They are able to analyze and to judge complex relations. They are ready to work self-dependently, to apply different development methods and to work on approaches to solve a problem, to develop practice-oriented products or processes.

Organizational issues
Begrenzte Teilnehmerzahl mit Auswahlverfahren, die Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.

Raum und Termine: s. Aushang bzw. Homepage

Literature

Steinle, Claus; Bruch, Heike; Lawa, Dieter (Hrsg.), Projektmanagement, Instrument moderner Innovation, FAZ Verlag, Frankfurt a. M., 2001, ISBN 978-3929368277

Skripte werden beim Start-up Meeting ausgegeben.

T 7.357 Course: Public International Law [T-INFO-113381]

Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	2400172	Public International Law	2 SWS	Lecture / 🗣	Kasper
Exams					
ST 2024	7500182	Public International Law			Zufall

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment is carried out as a written examination (§ 4 Abs. 2 No. 1 SPO) lasting 60 minutes.

Depending on the number of participants, it will be announced six weeks before the examination (§ 6 (3) SPO) whether the performance assessment is carried out
- as an oral examination (duration approx. 20 mins.) (§ 4 Abs. 2 Nr. 2 SPO) or
- as a written examination (lasting 60 mins.) (§ 4 Abs. 2 No. 1 SPO).

Prerequisites
None.

Recommendation
- General knowledge of (public) law (eg, through participating in public law or EU law modules) is helpful but not necessary.
- Interest in international affairs and politics is welcomed.

Annotation
Competency Goals:
- Participating students will be able to navigate the plethora of multilateral treaties to detect relevant international law for specific cases.
- They can develop solutions for legal problems based on case law of international courts and tribunals.
- Students will be able to read and comprehend international treaties and case law.
- They will have a fundamental understand of the interplay between various subfields of public international law.
- Students can identify and explain current issues in public international law.

Content:
The lecture is designed to provide participating students with a general understanding of the foundations, subjects, and sources of public international law, its interplay with national legal regimes, and more detailed knowledge of particular subfields of public international law.

Since the lecture targets students of information systems, particular focus will be given to economic topics in international law, such as investment and trade law aspects. Due to the general importance of climate change for todays (economic) law, international climate change law and environmental law will form further focus areas.

In addition, a concise overview on human rights law, the law on State responsibility, and the peaceful settlement of disputes will be provided.

Throughout the lecture, important case law will be referenced and students are expected to read relevant cases in part to facilitate a discussion of such cases and their relevance for a subject field. Although the United Nations, including its principal judicial organ, the International Court of Justice, is one of the, if not the, key international organization in public international law, further international organizations (eg, Council of Europe, World Trade Organization) and their respective law(s) will also be touched.

Students are advised to have a statute book at hand that includes the most important international treaties and conventions (eg, Evans, Blackstone's International Law Documents, currently 15th ed 2021).

Conducting the lecture in English intends to facilitate students to link their ideas and arguments to current debates in international law.

T 7.358 Course: Public Management [T-WIWI-102740]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101504 - Collective Decision Making
M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2561127	Public Management	3 SWS	Lecture / Practice (/	Wigger
Exams					
WT 23/24	790puma	Public Management			Wigger
ST 2024	790puma	Public Management			Wigger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1.5h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V Public Management

2561127, WS 23/24, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
Blended (On-Site/Online)

Organizational issues
Die Vorlesung wird im WS 23/24 in Hybrid-Modus angeboten: in der ersten Vorlesungswoche sowie im zweiwöchigen Rhythmus danach findet sie in Präsenz im entsprechend angegebenen Vorlesungsraum statt; in der zweiten Vorlesungswoche sowie alle zwei Wochen danach findet sie online über im ILIAS-Kurs angegebenen Zoom-Vorlesungsraum statt.

Literature
Weiterführende Literatur:

- Damkowski, W. und C. Precht (1995): Public Management; Kohlhammer
- Richter, R. und E.G. Furubotn (2003): Neue Institutionenökonomik; 3. Auflage, Mohr
- Schedler, K. und I. Proeller (2003): New Public Management; 2. Auflage; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2. Auflage; Springer

T 7.359 Course: Public Revenues [T-WIWI-102739]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2560120	Public Revenues	2 SWS	Lecture / 🗣	Wigger
ST 2024	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice / 🗣	Wigger, Schmelzer
Exams					
WT 23/24	790oeff	Public Revenues			Wigger
ST 2024	790oeff	Public Revenues			Wigger

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on the further pandemic development the assessment will consist either of an open book exam (following Art. 4, para. 2, clause 3 of the examination regulation), or of an 1h written exam (following Art. 4, para. 2, clause 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V Public Revenues

2560120, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
The *Public Revenues* lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

Learning goals:

See German version.

Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Literatur:

- Homburg, S.(2000): *Allgemeine Steuerlehre*, Vahlen
- Rosen, H.S.(1995): *Public Finance*; 4. Aufl., Irwin
- Wellisch, D.(2000): *Finanzwissenschaft I* und *Finanzwissenschaft III*, Vahlen
- Wigger, B. U.(2006): *Grundzüge der Finanzwissenschaft*; 2. Aufl., Springer

T 7.360 Course: Python Algorithm for Vehicle Technology [T-MACH-110796]

Responsible: Stephan Rhode
Organisation:
Part of: M-MACH-101265 - Vehicle Development
M-MACH-101266 - Automotive Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2114862	Python Algorithms for Automotive Engineering	2 SWS	Lecture / ✕	Rhode
Exams					
WT 23/24	76-T-Mach-110796	Python Algorithm for Vehicle Technology			Rhode

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
Written Examination

Duration: 90 minutes

Prerequisites
none

Below you will find excerpts from events related to this course:

V Python Algorithms for Automotive Engineering

2114862, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
Cancelled

Content
Teaching content:

- Introduction to Python and useful tools and libraries for creating algorithms, graphical representation, optimization, symbolic arithmetic and machine learning
  - Anaconda, Pycharm, Jupyter
  - NumPy, Matplotlib, SymPy, Scikit-Learn
- Methods and tools for creating software
  - Version management GitHub, git
  - Testing software pytest, Pylint
  - Documentation Sphinx
  - Continuous Integration (CI) Travis CI
  - Workflows in Open Source and Inner Source, Kanban, Scrum
- Practical programming projects to:
  - Road sign recognition
  - Vehicle state estimation
  - Calibration of vehicle models by mathematical optimization
  - Data-based modelling of the powertrain of an electric vehicle

Objectives:

The students have an overview of the programming language Python and important Python libraries to solve automotive engineering problems with computer programs. The students know current tools around Python to create algorithms, to apply them and to interpret and visualize their results. Furthermore, the students know
basics in the creation of software to be used in later programming projects in order to develop high-quality software solutions in teamwork. Through practical programming projects (road sign recognition, vehicle state estimation, calibration, data-based modelling), the students can perform future complex tasks from the area of driver assistance systems.

Organizational issues
Die Vorlesung wird im erst wieder im Sommersemester 2025 stattfinden.

Literature

- A Whirlwind Tour of Python, Jake VanderPlas, Publisher: O'Reilly Media, Inc. Release Date: August 2016, ISBN: 9781492037859 link
- Scientific Computing with Python 3, Olivier Verdier, Jan Erik Solem, Claus Führer, Publisher: Packt Publishing, Release Date: December 2016, ISBN: 9781786463517 link
- Introduction to Machine Learning with Python, Sarah Guido, Andreas C. Müller, Publisher: O'Reilly Media, Inc., Release Date: October 2016, ISBN: 9781449369880, link
- Clean Code, Robert C. Martin, Publisher: Prentice Hall, Release Date: August 2008, ISBN: 9780136083238, link

T 7.361 Course: Python for Computational Risk and Asset Management [T-WIWI-110213]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105032 - Data Science for Finance

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	3

Competence Certificate
The examination takes the form of an alternative exam assessment.
The alternative exam assessment consists of a Python-based "Takehome Exam". At the end of the third week of January, the student is given a "Takehome Exam" which he processes and sends back independently within 4 hours using Python. Precise instructions will be announced at the beginning of the course. The alternative exam assessment can be repeated a maximum of once. A timely repeat option takes place at the end of the third week in March of the same year. More detailed instructions will be given at the beginning of the course.

Prerequisites
None.

Recommendation
Good knowledge of statistics and basic programming skills

T 7.362 Course: Quality Management [T-MACH-102107]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	3

Events					
WT 23/24	2149667	Quality Management	2 SWS	Lecture /	Lanza
Exams					
WT 23/24	76-T-MACH-102107	Quality Management			Lanza
ST 2024	76-T-MACH-102107	Quality Management			Lanza

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Written Exam (60 min)

Prerequisites
It is not possible to combine this brick with brick Quality Management [T-MACH-112586].

Below you will find excerpts from events related to this course:

V **Quality Management**
2149667, WS 23/24, 2 SWS, Language: German, Open in study portal
Lecture (V)
Blended (On-Site/Online)

Content
Based on the quality philosophies Total Quality Management (TQM) and Six Sigma, the lecture deals with the requirements of modern quality management. Within this context, the process concept of a modern enterprise and the process-specific fields of application of quality assurance methods are presented. The lecture covers the current state of the art in preventive and non-preventive quality management methods in addition to manufacturing metrology, statistical methods and service related quality management. The content is completed with the presentation of certification possibilities and legal quality aspects.

Main topics of the lecture:

- The term "Quality"
- Total Quality Management (TQM) and Six Sigma
- Universal methods and tools
- QM during early product stages – product denition
- QM during product development and in procurement
- QM in production – manufacturing metrology
- QM in production – statistical methods
- QM in service
- Quality management systems
- Legal aspects of QM

Learning Outcomes:

The students …

- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Vorlesungstermine montags 09:45 Uhr
Übung erfolgt während der Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt:

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.363 Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

Responsible: Dr. Patrick Plötz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3,5	Grade to a third	Each winter term	3

Events					
WT 23/24	2581007	Quantitative Methods in Energy Economics	2 SWS	Lecture / 🗣	Plötz
WT 23/24	2581008	Übungen zu Quantitative Methods in Energy Economics	1 SWS	Practice / 🗣	Plötz, Britto
Exams					
WT 23/24	7981007	Quantitative Methods in Energy Economics			Fichtner
ST 2024	7981007	Quantitative Methods in Energy Economics			Fichtner

Legend: 📱 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) exam (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Quantitative Methods in Energy Economics

2581007, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

Learning Goals:

The student

- knows and understands selected quantitative methods of energy economics
- is able to use selected quantitative methods of energy economics
- understands they range of usage, limits and is autonomously able to adress new problems by them.

Literature
Wird in der Vorlesung bekannt gegeben.

T 7.364 Course: Quantum Functional Devices and Semiconductor Technology [T-ETIT-100740]

Responsible: Prof. Dr.-Ing. Christian Koos
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101294 - Nanotechnology
M-MACH-101295 - Optoelectronics and Optical Communication

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Prerequisites
none

T 7.365 Course: Rail System Technology [T-MACH-102143]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101274 - Rail System Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	9	Grade to a third	Each term	4

Events					
WT 23/24	2115919	Rail System Technology	2 SWS	Lecture / 🗣	Cichon, Heckele
WT 23/24	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🗣	Cichon, Reimann
ST 2024	2115919	Rail System Technology	2 SWS	Lecture / 🗣	Cichon
ST 2024	2115996	Rail Vehicle Technology	2 SWS	Lecture / 🗣	Cichon
Exams					
WT 23/24	76-T-MACH-102143	Rail System Technology			Cichon, Heckele, Reimann
ST 2024	76-T-MACH-102143	Rail System Technology			Cichon, Berthold

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written examination in German language
Duration: 120 minutes
No tools or reference materials may be used during the exam except calculator and dictionary

Prerequisites
none

Below you will find excerpts from events related to this course:

V Rail System Technology

2115919, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V Rail Vehicle Technology

2115996, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V

Rail System Technology

2115919, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, comparison electric traction and diesel traction, dc and ac networks, system pantograph and contact wire, filling stations

Organizational issues
ab SS 2024 schriftliche Prüfung

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

V

Rail Vehicle Technology

2115996, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, coupling, doors and windows
3. Bogies: forces, running gears, bogies, Jakobs-bogies, active components, connection to car body, wheel arrangement
4. Drives: priciples, electric drives (main components, asynchronous traction motor, inverter, with DC supply, with AC supply, without line supply, multisystem vehicles, dual mode vehicles, hybrid vehicles), non-electric drives
5. Brakes: basics, principles (wheel brakes, rail brakes, blending), brake control (requirements and operation modes, pneumatic brake, electropneumatic brake, emergency brake, parking brake)
6. Train control management system: definition of TCMS, bus systems, components, network architectures, examples, future trends
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck vehicles, locomotives, freight wagons

Organizational issues
ab SS 2024 schriftliche Prüfung

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.

A bibliography is available for download (Ilias-platform).

T 7.366 Course: Recommender Systems [T-WIWI-102847]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-105661 - Data Science: Intelligent, Adaptive, and Learning Information Services

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2540506	Recommender Systems	2 SWS	Lecture / 🗣	Geyer-Schulz
WT 23/24	2540507	Exercise Recommender Systems	1 SWS	Practice / 🗣	Geyer-Schulz, Nazemi
Exams					
WT 23/24	7900310	Recommender Systems (WS 2023/2024)			Geyer-Schulz
ST 2024	7900138	Recommender Systems			Geyer-Schulz

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V **Recommender Systems** — **Lecture (V) On-Site**
2540506, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

Learning objectives:

The student

- is proficient in different statistical, data-mining, and game theory methods of computing implicit and explicit recommendations
- evaluates recommender systems and compares these with related services

Workload:

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Exam:

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Grade: Minimum points

- 1,0: 95
- 1,3: 90
- 1,7: 85
- 2,0: 80
- 2,3: 75
- 2,7: 70
- 3,0: 65
- 3,3: 60
- 3,7: 55
- 4,0: 50
- 5,0: 0

Literature

Rakesh Agrawal, Tomasz Imielinski, and Arun Swami. Mining association rules between sets of items in large databases. In Sushil Jajodia Peter Buneman, editor, Proceedings of the ACM SIGMOD International Conference on Management of Data, volume 22, Washington, D.C., USA, Jun 1993. ACM, ACM Press.

Rakesh Agrawal and Ramakrishnan Srikant. Fast algorithms for mining association rules. In Proceedings of the 20th Very Large Databases Conference, Santiago, Chile, pages 487 – 499, Sep 1994.

Asim Ansari, Skander Essegaier, and Rajeev Kohli. Internet recommendation systems. Journal of Marketing Research, 37:363 – 375, Aug 2000.

Christopher Avery, Paul Resnick, and Richard Zweckhauser. The market for evaluations. American Economic Review, 89(3):564 – 584, 1999.

Ibrahim Cingil, Asuman Dogac, and Ayca Azgin. A Broader Approach to Personalization. Communications of the ACM, 43(8):136 – 141, Aug 2000.

Richard O. Duda, Peter E. Hart, and David G. Stork. Pattern Classification. Wiley-Interscience, New York, 2 edition, 2001.

Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. A customer purchase incidence model applied to recommender services. In R. Kohavi et al., editor, Proceedings of the WebKDD 2001 – Mining log data across all customer touchpoints, volume 2356 of Lecture Notes in Artificial Intelligence LNAI, pages 25–47, Berlin, 2002. ACM, Springer-Verlag.

Jon M. Kleinberg. Authoritative sources in a hyperlinked environment. JACM, 46(5):604–632, sep 1999.

Joseph Konstan, Bradley Miller, David Maltz, Jonathan Herlocker, Lee Gordon, and John Riedl. Grouplens: Applying Collaborative Filtering to Usernet News. Communications of the ACM, 40(3):77 – 87, Mar 1997.

Paul Resnick, Neophytos Iacovou, Peter Bergstrom, and John Riedl. Grouplens: An open architecture for collaborative filtering of netnews. In Proceedings of the conference on Computer supported cooperative work, pages 175 – 186. ACM Press, 1994.

Weiterführende Literatur:

Antoinette Alexander. The return of hardware: A necessary evil? Accounting Technology, 15(8):46 – 49, Sep 1999.

Christopher Avery and Richard Zeckhauser. Recommender systems for evaluating computer messages. Communications of the ACM, 40(3):88 – 89, Mar 1997.

Steven Bellman, Gerald Lohse, and Eric Johnson. Predictors of Online Buying Behavior. Communications of the ACM, 42(12):32 – 38, Dec 1999.

Thomas J. Blischok. Every transaction tells a story. Chain Store Age Executive with Shopping Center Age, 71(3):50–56, Mar 1995.

Hans Hermann Bock. Automatische Klassifikation. Vandenhoeck und Ruprecht, Göttingen, 1974.

Andrew S.C. Ehrenberg. Repeat-Buying: Facts, Theory and Applications. Charles Griffin & Company Ltd, London, 2 edition, 1988.

Wolfgang Gaul, Andreas Geyer-Schulz, Michael Hahsler, and Lars Schmidt-Thieme. eMarketing mittels Recommendersystemen. Marketing ZFP, 24:47 – 55, 2002.

Andreas Geyer-Schulz, Michael Hahsler, and Maximilian Jahn. myvu: a next generation recommender system based on observed consumer behavior and interactive evolutionary algorithms. In W. Gaul, O. Opitz, and M. Schader, editors, Data Analysis – Scientific Modeling and Practical Applications, volume 18 of Studies in Classification, Data Analysis and Knowledge Organization, pages 447 – 457, Heidelberg, Germany, 2000. Springer.

Andreas Geyer-Schulz, Michael Hahsler, and Maximillian Jahn. Educational and scientific recommender systems: Designing the information channels of the virtual university. International Journal of Engineering Education, 17(2):153 – 163, 2001.

Mark-Edward Grey. Recommendersysteme auf Basis linearer Regression, 2004.

John A. Hartigan. Clustering Algorithms. John Wiley and Sons, New York, 1975.

Kevin Kelly. New Rules for the New Economy: 10 Radical Strategies for a Connected World. Viking, 1998.

Taek-Hun Kim, Young-Suk Ryu, Seok-In Park, and Sung-Bong Yang. An improved recommendation algorithm in collaborative filtering. In K. Bauknecht, A. Min Tjoa, and G. Quirchmayr, editors, E-Commerce and Web Technologies, Third International Conference, Aix-en-Provence, France, volume 2455 of Lecture Notes in Computer Science, pages 254–261, Berlin, Sep 2002. Springer-Verlag.

Ron Kohavi, Brij Masand, Myra Spiliopoulou, and Jaideep Srivastava. Web mining. Data Mining and Knowledge Discovery, 6:5 – 8, 2002.

G. S. Maddala. Introduction to Econometrics. John Wiley, Chichester, 3 edition, 2001.

Andreas Mild and Martin Natter. Collaborative filtering or regression models for Internet recommendation systems? Journal of Targeting, Measurement and Analysis for Marketing, 10(4):304 – 313, Jan 2002.

Andreas Mild and Thomas Reutterer. An improved collaborative filtering approach for predicting cross-category purchases based on binary market basket data. Journal of Retailing & Consumer Services, 10(3):123–133, may 2003.

Paul Resnick and Hal R. Varian. Recommender Systems. Communications of the ACM, 40(3):56 – 58, Mar 1997.

Badrul M. Sarwar, Joseph A. Konstan, Al Borchers, Jon Herlocker, Brad Miller, and John Riedl. Using filtering agents to improve prediction quality in the grouplens research collaborative filtering system. In Proceedings of ACM Conference on Computer-Supported Cooperative Work, Social Filtering, Social Influences, pages 345 – 354, New York, 1998. ACM Press.

J. Ben Schafer, Joseph Konstan, and Jon Riedl. Recommender Systems in E-commerce. In Proceedings of the 1st ACM conference on Electronic commerce, pages 158 – 166, Denver, Colorado, USA, Nov 1999. ACM.

Upendra Shardanand and Patti Maes. Social information filtering: Algorithms for automating "word of mouth". In Proceedings of ACM SIGCHI, volume 1 of Papers: Using the Information of Others, pages 210 – 217. ACM, 1995.

T 7.367 Course: Regulation Theory and Practice [T-WIWI-102712]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4,5	Grade to a third	see Annotations	2

Competence Certificate
The lecture is not offered for an indefinite period of time.
Result of success is made by a 20-30 minutes oral examination. Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None

Recommendation
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.

Particularly helpful but not necessary: Industrial Economics and Principal-Agent- or Contract theories. Prior attendance of the lecture*Competition in Networks* [26240] is helpful in any case but not considered a formal precondition.

Annotation
The lecture is not offered for an indefinite period of time.

T 7.368 Course: Responsible Artificial Intelligence [T-WIWI-111385]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-103118 - Data Science: Data-Driven User Modeling
M-WIWI-105923 - Incentives, Interactivity & Decisions in Organizations

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2545164	Responsible Artificial Intelligence	2 SWS	Lecture / 🗣	Hoffmann, Miskiw
WT 23/24	2545165	Responsible Artificial Intelligence	1 SWS	Practice / 🗣	Hoffmann, Miskiw
Exams					
WT 23/24	7900180	Responsible Artificial Intelligence			Weinhardt

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The final grade is based on an examination of other type according to § 4 Par. 2 No. 3. It consists of

- The completion of an exercise including a short presentation (15 min)(max. 30 points)
- The completion of a case study including an oral exam (max. 60 points).

Further details are explained during the lecture.

Prerequisites
Prior to the start of the lecture, introductory materials will be provided for self-study. The lecture has a limitation of participants. Therefore, prior registration via the Wiwi-Portal is mandatory.

T 7.369 Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2581992	Risk Management in Industrial Supply Networks	2 SWS	Lecture / 🗣	Schultmann, Kaiser
Exams					
WT 23/24	7981992	Risk Management in Industrial Supply Networks			Schultmann
ST 2024	7981992	Risk Management in Industrial Supply Networks			Schultmann

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (examination of another type, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Risk Management in Industrial Supply Networks

2581992, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students learn methods and tools to manage risks in complex and dynamically evolving supply chain networks. Students learn the key terms and concepts of risk management and decision theory, in particular expected utility theory. Based on the theoretic prerequisites, students are able to determine and analyze risk diversification, risk pooling, insurance mechanisms and get an overview on statistical risk measures and real options. These approaches are adapted to analyze supply chain risks in a network context. In this manner, students gain knowledge in basic notions of network theory, network metrics and network-strategies for supply chain decisions.

- Introduction
- Risks in decisions under uncertainty: Expected Utility Theory & risk preferences
- The newsvendor model; multivariate risks and insurance
- Risk measures & evaluation techniques: Value-at-Risk, Conditional Value at Risk, Monte Carlo and Real Options
- Transparency in complex supply chains
- Network risk: network basics and criticality
- Risk in supply networks: empirical approaches and insights

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.370 Course: Roadmapping [T-WIWI-102853]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Competence Certificate
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.

T 7.371 Course: Safety Engineering [T-MACH-105171]

Responsible: Hans-Peter Kany
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	2

Events					
WT 23/24	2117061	Safety Engineering	2 SWS	Lecture / 🗣	Kany
Exams					
WT 23/24	76-T-MACH-105171	Safety Engineering			Furmans

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Safety Engineering

2117061, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Media
Presentations

Learning content
The course provides basic knowledge of safety engineering. In particular the basics of health at the working place, job safety in Germany, national and European safety rules and the basics of safe machine design are covered. The implementation of these aspects will be illustrated by examples of material handling and storage technology. This course focuses on: basics of safety at work, safety regulations, basic safety principles of machine design, protection devices, system security with risk analysis, electronics in safety engineering, safety engineering for storage and material handling technique, electrical dangers and ergonomics. So, mainly, the technical measures of risk reduction in specific technical circumstances are covered.

Learning goals
The students are able to:

- Name and describe relevant safety concepts of safety engineering,
- Discuss basics of health at work and labour protection in Germany,
- Evaluate the basics for the safe methods of design of machinery with the national and European safety regulations and
- Realize these objectives by using examples in the field of storage and material handling systems.

Recommendations
None

Workload
Regular attendance: 21 hours
Self-study: 99 hours

Organizational issues
Termine: siehe ILIAS.

Literature
Defren/Wickert: Sicherheit für den Maschinen- und Anlagenbau, Druckerei und
Verlag: H. von Ameln, Ratingen

T 7.372 Course: Safety Management in Highway Engineering [T-BGU-101674]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101066 - Safety, Computing and Law in Highway Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6233906	Sicherheitsmanagement im Straßenwesen	2 SWS	Lecture / Practice (/	Zimmermann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
oral exam with 15 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.373 Course: Selected Legal Issues of Internet Law [T-INFO-108462]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each summer term	1

Events					
ST 2024	24821	Selected legal issues of Internet law	2 SWS	Colloquium (K / 🗣)	Sattler
Exams					
ST 2024	7500099	Selected Legal Issues of Internet Law			Sattler

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.374 Course: Selected topics of system integration for micro- and nanotechnology [T-MACH-105695]

Responsible: apl. Prof. Dr. Ulrich Gengenbach
Prof. Dr. Veit Hagenmeyer
Dr. Liane Koker
apl. Prof. Dr. Ingo Sieber

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	2

Competence Certificate
oral exam (Duration: 30min)

Prerequisites
T-MACH-108809 "Micro- and nanosystem integration for medical, fluidic and optical applications" must not be started.

T 7.375 Course: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

Responsible: Dr. Mathias Heckele
Dr.-Ing. Timo Mappes

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101290 - BioMEMS

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Competence Certificate
Oral examination

Prerequisites
none

T 7.376 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-111439]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	2	Grade to a third	2

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.377 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-113353]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	2	Grade to a third	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.378 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-111438]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	1	Grade to a third	2

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.379 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-113354]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.380 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-111440]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	2

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.381 Course: Self-Booking-HOC-SPZ-ZAK-STK-Graded [T-WIWI-113352]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	1	Grade to a third	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a graded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.382 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-111441]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	1	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.383 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-113356]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	2	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.384 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-111442]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	2	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.385 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-113355]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	1	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.386 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-111443]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	3	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.387 Course: Self-Booking-HOC-SPZ-ZAK-STK-Ungraded [T-WIWI-113357]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Completed coursework	3	pass/fail	1

Self service assignment of supplementary stdues
This course can be used for self service assignment of grade aquired from the following study providers:

- House of Competence
- Sprachenzentrum
- Zentrum für Angewandte Kulturwissenschaft und Studium Generale
- Studienkolleg

Annotation
Placeholder for self-booking of a ungraded interdisciplinary qualification, which was provided at the House of Competence, the "Sprachenzentrum" or the Center for Applied Cultural Studies and Studium Generale.

T 7.388 Course: Semantic Web Technologies [T-WIWI-110848]

Responsible: Dr.-Ing. Tobias Christof Käfer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2511310	Semantic Web Technologies	2 SWS	Lecture / 🗣	Färber, Käfer, Braun
ST 2024	2511311	Exercises to Semantic Web Technologies	1 SWS	Practice / 🗣	Färber, Käfer, Braun
Exams					
WT 23/24	79AIFB_SWebT_A2	Semantic Web Technologies			Käfer
ST 2024	79AIFB_SWebT_A4	Semantic Web Technologies (Registration until 15 July 2024)			Käfer

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendation
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required.

Below you will find excerpts from events related to this course:

V **Semantic Web Technologies** — **Lecture (V) On-Site**
2511310, SS 2024, 2 SWS, Language: English, Open in study portal

Content
The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals

Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 60 hours
- Exam and exam preperation: 30 hours

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

V **Exercises to Semantic Web Technologies** **Practice (Ü) On-Site**
2511311, SS 2024, 1 SWS, Language: English, Open in study portal

Content
The exercises are related to the lecture Semantic Web Technologies.

Multiple exercises are held that capture the topics, held in the lecture Semantic Web Technologies, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:

The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Organizational issues
Die Übungen finden im Rahmen der Termine der Blockvorlesung statt.

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Weitere Literatur

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

T 7.389 Course: Seminar Application of Artificial Intelligence in Production [T-MACH-112121]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105968 - Artificial Intelligence in Production
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	5

Events					
ST 2024	2150910	Seminar Application of Artificial Intelligence in Production	2 SWS	Seminar / 🗣	Fleischer
Exams					
ST 2024	76-T-MACH-112121	Seminar Application of Artificial Intelligence in Production			Fleischer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative test achievement (graded):

- Presentation of the results (approx. 20 min) followed by a colloquium (approx. 15 min) with weighting 25%
- Written processing of the results with weighting 75%

Prerequisites
none

Recommendation
Previous participation in the lecture 2149921 "Artificial Intelligence in Production" or advanced knowledge of Python.

Below you will find excerpts from events related to this course:

V Seminar Application of Artificial Intelligence in Production

2150910, SS 2024, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The module AI in Production is designed to teach students the practical, holistic integration of machine learning methods and the application of artificial intelligence in production. The course is oriented towards the phases of the CRISP-DM process with the aim of developing a deep understanding of the necessary steps and content-related aspects (methods) within the individual phases. In addition to teaching the practical aspects of integrating the most important machine learning methods, the focus here is primarily on the necessary steps for data generation and data preparation as well as the implementation and validation of the methods in an industrial environment.

The lecture "Seminar Application of Artificial Intelligence in Production" aims at the practical integration of current machine learning methods based on realistic industrial use cases. The content framework of the lecture results from the holistic, practical implementation of an AI project in production. First, the necessary Deep Learning programming basics are taught using the Keras software package. Subsequently, practice-relevant use cases are defined, which are to be implemented practically with the methods of machine learning and especially deep learning.

Learning Outcomes:

The Students

- are able to independently analyze a practical problem in production with regard to the application of machine learning methods.
- will be able to independently apply common deep learning algorithms to practical data sets, validate them, and analyze the results.
- understand the challenges of using deep learning methods in production.
- will know the main action areas and open research questions for the successful implementation of AI in production and for the implementation of autonomous machines.
- are able to evaluate the results of current deep learning methods and, based on these, to develop and practically apply proposed solutions (from the field of machine learning).

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Zur Vertiefung des im Rahmen der Lehrveranstaltung erworbenen Wissens werden die theoretischen Vorlesungseinheiten durch Praxiseinheiten im Umfeld der Karlsruher Forschungsfabrik (https://www.karlsruher-forschungsfabrik.de) unterstützt.

The theoretical lectures are complemented by practical lectures in the Karlsruhe Research Factory (https://www.karlsruher-forschungsfabrik.de/en.html) to deepen the acquired knowledge.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 7.390 Course: Seminar Creating a Patent Specification [T-ETIT-100754]

Responsible: Prof. Dr. Wilhelm Stork
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	3	pass/fail	Each summer term	1

Events					
ST 2024	2311633	Seminar Creating a Patent Specification	2 SWS	Seminar / 🗣	Stork
Exams					
ST 2024	7311633	Seminar Creating a Patent Specification			Stork

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 7.391 Course: Seminar Data-Mining in Production [T-MACH-108737]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🗣	Lanza
ST 2024	2151643	Seminar Data Mining in Production	2 SWS	Seminar / 🗣	Lanza
Exams					
WT 23/24	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza
ST 2024	76-T-MACH-108737	Seminar Data-Mining in Production			Lanza

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Annotation
The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Below you will find excerpts from events related to this course:

V **Seminar Data Mining in Production** — **Seminar (S) On-Site**
2151643, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

Learning Outcomes:

The students …

- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues
Die Teilnehmerzahl ist auf zwölf Studierende begrenzt. Termine und Fristen zur Veranstaltung werden unter https://www.wbk.kit.edu/studium-und-lehre.php bekanntgegeben.

The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

V

Seminar Data Mining in Production

2151643, SS 2024, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

Learning Outcomes:

The students …

- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues
Die Teilnehmerzahl ist auf zwölf Studierende begrenzt. Termine und Fristen zur Veranstaltung werden unter https://www.wbk.kit.edu/studium-und-lehre.php bekanntgegeben.

The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

T 7.392 Course: Seminar in Business Administration A (Master) [T-WIWI-103474]

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2500006	Digital Citizen Science	2 SWS	Seminar / 🗣	Woll, Bachert, Weinhardt, Volkamer, Mädche, Scheibehenne, Nieken, Szech
WT 23/24	2500125	Engineering Seminar: Human-Centered Systems	2 SWS	Seminar / 🧩	Mädche
WT 23/24	2530293		2 SWS	Seminar / 💻	Ruckes, Hoang, Benz, Luedecke, Silbereis, Wiegratz, Kohl
WT 23/24	2530586			Seminar / 🗣	Uhrig-Homburg, Eska, Molnar
WT 23/24	2540473	Business Data Analytics	2 SWS	Seminar / 🗣	Badewitz, Grote, Schulz, Motz
WT 23/24	2540475	Positive Information Systems	2 SWS	Seminar / 🗣	Knierim, del Puppo
WT 23/24	2540478	Smart Grids and Energy Markets	2 SWS	Seminar / 🗣	Weinhardt, Semmelmann, Miskiw
WT 23/24	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar / 🧩	Geyer-Schulz, Nazemi, Schweizer
WT 23/24	2540557	Research Seminar: Human-Centered Systems	2 SWS	Seminar / 🧩	Mädche
WT 23/24	2550493	Hospital Management	2 SWS	Block / 💻	Hansis
WT 23/24	2571181	Seminar Digital Marketing (Master)	2 SWS	Seminar / 🗣	Kupfer
WT 23/24	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
WT 23/24	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
WT 23/24	2579911	Seminar Management Accounting - Special Topics	2 SWS	Seminar / 🗣	Wouters, Dickemann, Letmathe
WT 23/24	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar / 🗣	Wouters, Dickemann
WT 23/24	2581030	Seminar in Energy Economics	2 SWS	Seminar / 🗣	Fichtner, Sloot
WT 23/24	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar / 🗣	Schultmann, Rudi
WT 23/24	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar / 🗣	Volk, Schultmann
WT 23/24	2581978	Seminar Produktionswirtschaft und Logistik III	2 SWS	Seminar / 🗣	Schultmann, Kaiser
WT 23/24	2581979	Seminar in Energy Economics	2 SWS	Seminar / 🗣	Fichtner, Kleinebrahm, Finck
WT 23/24	2581981	Seminar in Energy Economics	2 SWS	Seminar / 🗣	Ardone, Fichtner
ST 2024	2400121	Interactive Analytics Seminar	2 SWS	/ 💻	Beigl, Mädche
ST 2024	2500020	Digital Democracy - Challenges and opportunities of the digital society	2 SWS	Seminar / 🧩	Fegert

ST 2024	2500024	Biosignals in Information Systems & Marketing	2 SWS	Seminar /	Knierim, del Puppo
ST 2024	2500027	Design Seminar: Digital Citizen Science	2 SWS	Seminar	Berens, Volkamer, Mädche
ST 2024	2500036	Affective User Research for Human-AI Interaction	2 SWS	Seminar /	Mädche
ST 2024	2500125	Human-Centered Systems Seminar: Engineering	3 SWS	Seminar /	Mädche
ST 2024	2530580	Seminar in Finance (Master)	2 SWS	Seminar /	Uhrig-Homburg, Müller
ST 2024	2540473	Business Data Analytics	2 SWS	Seminar	Hariharan
ST 2024	2540475	Platforms & Digital Experiences	2 SWS	Seminar	Knierim
ST 2024	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Weinhardt
ST 2024	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2024	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar /	Mädche, Beigl
ST 2024	2540557	Human-Centered Systems Seminar: Research	3 SWS	Seminar /	Mädche
ST 2024	2545002	Entrepreneurship Research	2 SWS	Seminar /	Terzidis, Tittel, Rosales Bravo
ST 2024	2550493	Hospital Management	2 SWS	Block /	Hansis
ST 2024	2571180	Seminar in Marketing and Sales (Master)	2 SWS	Seminar /	Klarmann, Mitarbeiter
ST 2024	2571182	Seminar “The Future of Marketing” (Master)	2 SWS	Seminar /	Kupfer
ST 2024	2579909	Seminar Management Accounting - Special Topics	2 SWS	Seminar /	Wouters, Jaedeke, Kepl
ST 2024	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar /	Letmathe
ST 2024	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar /	Fichtner, Sloot
ST 2024	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar /	Volk, Schultmann
ST 2024	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar /	Fichtner, Finck
Exams					
WT 23/24	00072	Seminar Positive Information Systems			Weinhardt
WT 23/24	00074	Seminar Business Data Analytics			Weinhardt
WT 23/24	00077	Seminar in Information Systems (Master) - Data Mining in Production			Satzger
WT 23/24	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 23/24	7900050	Development of Sustainable Business Models			Weissenberger-Eibl
WT 23/24	7900069	Engineering Seminar: Human-Centered Systems			Mädche
WT 23/24	7900106	Hospital Management			Hansis
WT 23/24	7900151	Master Seminar in Data Science and Machine Learning			Geyer-Schulz
WT 23/24	7900163	Seminar Human Resource Management (Master)			Nieken
WT 23/24	7900164	Seminar Human Resources and Organizations (Master)			Nieken
WT 23/24	7900184	Seminar in Finance (Master)			Ruckes
WT 23/24	7900203	Seminar "Finance in a nutshell"			Uhrig-Homburg
WT 23/24	7900233	Research Seminar: Human-Centered Systems			Mädche
WT 23/24	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl
WT 23/24	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg
WT 23/24	7900333	Seminar Digital Marketing (Master)			Kupfer
WT 23/24	7900335	Seminar Energy Economics IV			Fichtner
WT 23/24	7900345	Development of Sustainable Digital Business Models			Weissenberger-Eibl
WT 23/24	79-2579911-M	Seminar Management Accounting - Special Topics (Master) - Porsche			Wouters

WT 23/24	79-2579919-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
WT 23/24	7981976	Seminar in Production and Operations Management I	Schultmann
WT 23/24	7981977	Seminar in Production and Operations Management II	Schultmann
WT 23/24	7981978	Seminar in Production and Operations Management III	Schultmann
WT 23/24	7981979	Seminar Energy Economics I	Fichtner
WT 23/24	7981981	Seminar Energy Economics III	Fichtner
ST 2024	7900008	Hospital Management	Hansis
ST 2024	7900052	Entrepreneurship Research	Terzidis
ST 2024	7900190	Human-Centered Systems Seminar: Engineering	Mädche
ST 2024	7900233	Seminar in Marketing and Sales (Master)	Klarmann
ST 2024	7900261	Human-Centered Systems Seminar: Research	Mädche
ST 2024	7900265	User-Adaptive Systems Seminar	Mädche
ST 2024	7900281	Affective User Research for Human-AI Interaction	Mädche
ST 2024	7900307	Service Design Thinking	Satzger
ST 2024	7900312	Practical Seminar Service Innovation	Satzger
ST 2024	79-2579909-M	Seminar Management Accounting - Special Topics (Master)	Wouters
ST 2024	79-2579919-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
ST 2024	792581030	Seminar Energy Economics IV	Fichtner
ST 2024	792581031	Seminar Energy Economics V	Plötz
ST 2024	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2024	7981978	Seminar in Production and Operations Management III	Schultmann
ST 2024	7981979	Seminar Energy Economics I	Fichtner
ST 2024	7981980	Seminar Energy Economics II	Fichtner
ST 2024	7981981	Seminar Energy Economics III	Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V 2530586, WS 23/24, SWS, Language: German, Open in study portal **Seminar (S) On-Site**

Content
Within this seminar eLearning videos are produced to different topics out of the contents of our lectures. The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.Through conduction of the video the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

The success is monitored by the development of an eLearning video and by the writing of a project report (according to §4(2), 3 SPO).

The overall grade is made up of these partial performances.

Recommendations:

Knowledge of the content of the modules *Essentials of Finance* [WW3BWLFBV1] (for bachelor students) and *F1 (Finance)* [WW4BWLFBV1] (for master students) is assumed.

The total workload for this course is approximately 90 hours. For further information see German version.

Organizational issues
Zwischenpräsentation am 11.12.23, 16 Uhr und Abschlusspräsentation am 23.01.24, 17:30 Uhr, beides am Campus B (Geb. 09.21), Raum 209

V **Business Data Analytics** — **Seminar (S) On-Site**
2540473, WS 23/24, 2 SWS, Language: German/English, Open in study portal

Content
wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

V **Master Seminar in Data Science and Machine Learning** — **Seminar (S) Blended (On-Site/Online)**
2540510, WS 23/24, 2 SWS, Language: German, Open in study portal

V **Hospital Management** — **Block (B) Online**
2550493, WS 23/24, 2 SWS, Language: German, Open in study portal

V **Seminar Human Resource Management (Master)** — **Seminar (S) On-Site**
2573012, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V Seminar Human Resources and Organizations (Master)

2573013, WS 23/24, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V Seminar Management Accounting - Special Topics

2579911, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 12 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

V Seminar Management Accounting - Sustainability Topics

2579919, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 8 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

V Interactive Analytics Seminar

2400121, SS 2024, 2 SWS, Language: English, Open in study portal

Online

Content
Providing new and innovative ways for interacting with data is becoming increasingly important. In this seminar, an interdisciplinary team of students engineers a running software prototype of an advanced interactive system leveraging state-of-the-art hardware and software focusing on an analytical use case. The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). This seminar follows an interdisciplinary approach. Students the fields of computer science, information systems and industrial engineering work together in teams.

Learning Objectives

- Explore and specify a data-driven interaction challenge
- Suggest and evaluate different design solutions for addressing the identified problem
- Build interactive analytics prototypes using advanced interaction concepts and pervasive computing technologies

Prerequisites

Strong analytic abilities and profound skills in SQL as wells as Python and/or R are required.

Literature

Further literature will be made available in the seminar.

Organizational issues
nach Vereinbarung

V **Design Seminar: Digital Citizen Science** — **Seminar (S)**
2500027, SS 2024, 2 SWS, Open in study portal

Content
TBA

V **Affective User Research for Human-AI Interaction** — **Seminar (S)** **Blended (On-Site/Online)**
2500036, SS 2024, 2 SWS, Language: English, Open in study portal

Content
User research aims to understand users' needs, behaviors, and attitudes to effectively inform the design and development of products or services. It is a key endeavor to learn how users experience digital technologies, what is working well and what is not, and identify gaps and future needs in order to personalize and improve the user experience. To design for positive user experiences, investigating affective user reactions (e.g., emotions, stress, flow) is of particular interest. Therefore, affective user research collects and analyzes behavioral data and affective reactions of users when engaging with products or services. With the growing amount of data and computing capabilities, artificial intelligence (AI) technologies are increasingly used in user research for the prediction of affective user states when interacting with digital technology.

The recent advances in artificial intelligence (AI), however, may not only support affective user research as a method of inquire, but it also has found its way into our daily lives as humans interact with it every day, for example, in form of recommendation engines on social media, in health applications, or as personal assistants based on large language models (LLMs) to receive text output for code completion, ideation, or writing. Interacting with AI-based digital technologies also triggers affective user reactions. However, these affective user reactions in Human-AI Interactions are yet to be understood.

In this seminar, participants will apply methods for affective user research on a particular type of Human-AI Interaction, the prompting of LLMs. LLM prompting is expected to become the up-and-coming form of interacting with AI in the future. To receive output from an LLM, users must send a prompt to the LLM. Given a prompt, an LLM responds incrementally with “tokens” (e.g., groups of letters, numbers, punctuation) which build the output. Structuring the prompt and receiving output influences the affective reactions of the user. Precisely, these user reactions should be investigated by the students participating in this seminar.

In the "Affective User Research for Human-AI Interaction" seminar, participating students will learn how to apply AI-based user research methods with a specific emphasis on the affective dimension when interacting with AI-based digital technologies. The goal of this seminar is to provide students with a unique set of skills in (1) quantitative data analysis, (2) knowledge about Human-AI Interaction and, in particular, LLM prompting, and (3) prediction of affective user states (e.g., emotions, stress) using state-of-the-art machine learning (ML) techniques. Students will leverage a dataset on Human-AI Interaction and gain in-depth knowledge from it as part of the seminar. The seminar emphasizes the importance of applying the aforementioned affective user research methods in an ethically compliant form. The core activities include:

- Learn the fundamentals of AI-based affective user research methods.
- Explore a dataset on Human-AI Interaction with the specific focus on the interplay of user behavior and affective user reactions.
- Developing AI-based supervised machine learning techniques for predicting user activities and affective user states.
- Present findings and insights to the seminar audience and discuss the results.

The seminar is held by Dr. Ivo Benke in cooperation with Dr. Lennard Schmidt. Both are experts from industry in the fields of affective user research, quantitative data analysis, and Human-AI Interaction.

Learning Objectives

- Understand the potential of combining user behavior and affective user reaction data for affective user research.
- Develop hands-on knowledge by applying AI-based affective user research methods on a real-world dataset.
- Develop a deeper understanding of a prominent form of Human-AI Interaction (e.g., LLM prompting).
- Deliver a presentation in a scientific context in front of an auditorium.

V **Human-Centered Systems Seminar: Engineering** — **Seminar (S)** **Blended (On-Site/Online)**
2500125, SS 2024, 3 SWS, Language: English, Open in study portal

Content
Formerly known as "Current Topics in Digital Transformation"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the human-centered systems lab (Prof. Mädche). Students will work on a dedicated topic in the context of human-centered systems and apply a pre-defined research method. A broad spectrum of topics is offered every semester, topics may range from creating an experimental design, analyzing collected data, or systematically comparing existing software prototypes in a specific field of interest.

V **Master Seminar in Data Science and Machine Learning** — **Seminar (S)**
2540510, SS 2024, 2 SWS, Language: German/English, Open in study portal

V **User-Adaptive Systems Seminar** — **Seminar (S)** **Blended (On-Site/Online)**
2540553, SS 2024, 2 SWS, Language: English, Open in study portal

Content
User-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a user-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (h-lab, Prof. Mädche). It is offered as part of the DFG-funded graduate school “KD2School: Designing Adaptive Systems for Economic Decisions“ (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-adaptive system prototype

Prerequisites
Strong analytical abilities and profound software development skills are required.

Organizational issues
Termine werden bekannt gegeben

Literature
Required literature will be made available in the seminar.

V **Human-Centered Systems Seminar: Research** — **Seminar (S)** **Blended (On-Site/Online)**
2540557, SS 2024, 3 SWS, Language: English, Open in study portal

Content
Formerly known as "Information Systems and Service Design Seminar"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group IS I (Prof. Mädche). The research group "Information Systems I" (IS I) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues
Termine werden bekannt gegeben

V **Entrepreneurship Research** **Seminar (S)**
2545002, SS 2024, 2 SWS, Language: English, Open in study portal **On-Site**

Content
Content

In this course, the students choose from various relevant and current research topics in entrepreneurship and independently develop a topic that suits them in small teams. Initially, there is an introduction to standard methods such as systematic literature review, design science, qualitative and quantitative data analysis, and more. The seminar topic must be scientifically prepared and presented in 15-20 pages as part of a written elaboration. The seminar results are presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

The foundations of independent scholarly work (literature review, argumentation + discussion, citation of literature sources, application of qualitative, quantitative, and simulation methods) are developed as part of the written elaboration. The competencies acquired in the seminar can be utilized in preparing for a potential master's thesis. Therefore, the seminar is mainly aimed at students who intend to write their thesis at the Chair of Entrepreneurship and Technology Management and wish to gain substantial experience in entrepreneurship research.

Organizational issues
Monday, 17.06.2024, 10.00-17.00
Thursday, 27.06.2024, 10.00-17.00
Thursday, 25.07.2024, 10.00-17.00

Registration is via the Wiwi-Portal.

Literature
Will be announced in the seminar.

V

Hospital Management

2550493, SS 2024, 2 SWS, Language: German, Open in study portal

Block (B)
Online

Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

The assessment consists of attendance and a presentation or a case study.

Organizational issues
Das Seminar wird als Blockveranstaltung stattfinden. Die Termine werden bei der Anmeldung über das Wiwi-Portal bekanntgegeben.

V

Seminar Management Accounting - Special Topics

2579909, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

V

Seminar Management Accounting - Sustainability Topics

2579919, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 8 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

T 7.393 Course: Seminar in Business Administration B (Master) [T-WIWI-103476]

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2500006	Digital Citizen Science	2 SWS	Seminar / 🗣	Woll, Bachert, Weinhardt, Volkamer, Mädche, Scheibehenne, Nieken, Szech
WT 23/24	2500125	Engineering Seminar: Human-Centered Systems	2 SWS	Seminar / 🧩	Mädche
WT 23/24	2530293		2 SWS	Seminar / 💻	Ruckes, Hoang, Benz, Luedecke, Silbereis, Wiegratz, Kohl
WT 23/24	2530586			Seminar / 🗣	Uhrig-Homburg, Eska, Molnar
WT 23/24	2540473	Business Data Analytics	2 SWS	Seminar / 🗣	Badewitz, Grote, Schulz, Motz
WT 23/24	2540475	Positive Information Systems	2 SWS	Seminar / 🗣	Knierim, del Puppo
WT 23/24	2540478	Smart Grids and Energy Markets	2 SWS	Seminar / 🗣	Weinhardt, Semmelmann, Miskiw
WT 23/24	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar / 🧩	Geyer-Schulz, Nazemi, Schweizer
WT 23/24	2540557	Research Seminar: Human-Centered Systems	2 SWS	Seminar / 🧩	Mädche
WT 23/24	2550493	Hospital Management	2 SWS	Block / 💻	Hansis
WT 23/24	2571181	Seminar Digital Marketing (Master)	2 SWS	Seminar / 🗣	Kupfer
WT 23/24	2573012	Seminar Human Resource Management (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
WT 23/24	2573013	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar / 🗣	Nieken, Mitarbeiter
WT 23/24	2579911	Seminar Management Accounting - Special Topics	2 SWS	Seminar / 🗣	Wouters, Dickemann, Letmathe
WT 23/24	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar / 🗣	Wouters, Dickemann
WT 23/24	2581030	Seminar in Energy Economics	2 SWS	Seminar / 🗣	Fichtner, Sloot
WT 23/24	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar / 🗣	Schultmann, Rudi
WT 23/24	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar / 🗣	Volk, Schultmann
WT 23/24	2581978	Seminar Produktionswirtschaft und Logistik III	2 SWS	Seminar / 🗣	Schultmann, Kaiser
WT 23/24	2581979	Seminar in Energy Economics	2 SWS	Seminar / 🗣	Fichtner, Kleinebrahm, Finck
WT 23/24	2581981	Seminar in Energy Economics	2 SWS	Seminar / 🗣	Ardone, Fichtner
ST 2024	2500020	Digital Democracy - Challenges and opportunities of the digital society	2 SWS	Seminar / 🧩	Fegert
ST 2024	2500024	Biosignals in Information Systems & Marketing	2 SWS	Seminar / 🧩	Knierim, del Puppo

ST 2024	2500027	Design Seminar: Digital Citizen Science	2 SWS	Seminar	Berens, Volkamer, Mädche
ST 2024	2500036	Affective User Research for Human-AI Interaction	2 SWS	Seminar /	Mädche
ST 2024	2500125	Human-Centered Systems Seminar: Engineering	3 SWS	Seminar /	Mädche
ST 2024	2530580	Seminar in Finance (Master)	2 SWS	Seminar /	Uhrig-Homburg, Müller
ST 2024	2540473	Business Data Analytics	2 SWS	Seminar	Hariharan
ST 2024	2540475	Platforms & Digital Experiences	2 SWS	Seminar	Knierim
ST 2024	2540478	Smart Grid Economics & Energy Markets	2 SWS	Seminar	Weinhardt
ST 2024	2540510	Master Seminar in Data Science and Machine Learning	2 SWS	Seminar	Geyer-Schulz
ST 2024	2540553	User-Adaptive Systems Seminar	2 SWS	Seminar /	Mädche, Beigl
ST 2024	2540557	Human-Centered Systems Seminar: Research	3 SWS	Seminar /	Mädche
ST 2024	2545002	Entrepreneurship Research	2 SWS	Seminar /	Terzidis, Tittel, Rosales Bravo
ST 2024	2550493	Hospital Management	2 SWS	Block /	Hansis
ST 2024	2571180	Seminar in Marketing and Sales (Master)	2 SWS	Seminar /	Klarmann, Mitarbeiter
ST 2024	2571182	Seminar “The Future of Marketing” (Master)	2 SWS	Seminar /	Kupfer
ST 2024	2579909	Seminar Management Accounting - Special Topics	2 SWS	Seminar /	Wouters, Jaedeke, Kepl
ST 2024	2579919	Seminar Management Accounting - Sustainability Topics	2 SWS	Seminar /	Letmathe
ST 2024	2581030	Seminar Energiewirtschaft IV	2 SWS	Seminar /	Fichtner, Sloot
ST 2024	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar /	Volk, Schultmann
ST 2024	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar /	Fichtner, Finck
Exams					
WT 23/24	00072	Seminar Positive Information Systems			Weinhardt
WT 23/24	00074	Seminar Business Data Analytics			Weinhardt
WT 23/24	00077	Seminar in Information Systems (Master) - Data Mining in Production			Satzger
WT 23/24	7900017	Seminar Smart Grid and Energy Markets			Weinhardt
WT 23/24	7900050	Development of Sustainable Business Models			Weissenberger-Eibl
WT 23/24	7900069	Engineering Seminar: Human-Centered Systems			Mädche
WT 23/24	7900106	Hospital Management			Hansis
WT 23/24	7900151	Master Seminar in Data Science and Machine Learning			Geyer-Schulz
WT 23/24	7900163	Seminar Human Resource Management (Master)			Nieken
WT 23/24	7900164	Seminar Human Resources and Organizations (Master)			Nieken
WT 23/24	7900184	Seminar in Finance (Master)			Ruckes
WT 23/24	7900203	Seminar "Finance in a nutshell"			Uhrig-Homburg
WT 23/24	7900233	Research Seminar: Human-Centered Systems			Mädche
WT 23/24	7900237	Case Studies Seminar: Innovation Management			Weissenberger-Eibl
WT 23/24	7900318	Bond Markets - Models & Derivatives			Uhrig-Homburg
WT 23/24	7900333	Seminar Digital Marketing (Master)			Kupfer
WT 23/24	7900335	Seminar Energy Economics IV			Fichtner
WT 23/24	7900345	Development of Sustainable Digital Business Models			Weissenberger-Eibl
WT 23/24	79-2579911-M	Seminar Management Accounting - Special Topics (Master) - Porsche			Wouters
WT 23/24	79-2579919-M	Seminar Management Accounting - Sustainability Topics (Master)			Wouters
WT 23/24	7981976	Seminar in Production and Operations Management I			Schultmann

WT 23/24	7981977	Seminar in Production and Operations Management II	Schultmann
WT 23/24	7981978	Seminar in Production and Operations Management III	Schultmann
WT 23/24	7981979	Seminar Energy Economics I	Fichtner
WT 23/24	7981981	Seminar Energy Economics III	Fichtner
ST 2024	7900008	Hospital Management	Hansis
ST 2024	7900052	Entrepreneurship Research	Terzidis
ST 2024	7900190	Human-Centered Systems Seminar: Engineering	Mädche
ST 2024	7900233	Seminar in Marketing and Sales (Master)	Klarmann
ST 2024	7900261	Human-Centered Systems Seminar: Research	Mädche
ST 2024	7900265	User-Adaptive Systems Seminar	Mädche
ST 2024	7900281	Affective User Research for Human-AI Interaction	Mädche
ST 2024	7900307	Service Design Thinking	Satzger
ST 2024	7900312	Practical Seminar Service Innovation	Satzger
ST 2024	79-2579909-M	Seminar Management Accounting - Special Topics (Master)	Wouters
ST 2024	79-2579919-M	Seminar Management Accounting - Sustainability Topics (Master)	Wouters
ST 2024	792581030	Seminar Energy Economics IV	Fichtner
ST 2024	792581031	Seminar Energy Economics V	Plötz
ST 2024	7981976	Seminar in Production and Operations Management I	Schultmann
ST 2024	7981978	Seminar in Production and Operations Management III	Schultmann
ST 2024	7981979	Seminar Energy Economics I	Fichtner
ST 2024	7981980	Seminar Energy Economics II	Fichtner
ST 2024	7981981	Seminar Energy Economics III	Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V 2530586, WS 23/24, SWS, Language: German, Open in study portal **Seminar (S) On-Site**

Content
Within this seminar eLearning videos are produced to different topics out of the contents of our lectures. The student gets in touch with scientific work. Through profound working on a specific scientific topic the student is meant to learn the foundations of scientific research and reasoning in particular in finance.Through conduction of the video the student becomes familiar with the fundamental techniques for presentations and foundations of scientific reasoning. In addition, the student earns rhetorical skills.

The success is monitored by the development of an eLearning video and by the writing of a project report (according to §4(2), 3 SPO).

The overall grade is made up of these partial performances.

Recommendations:

Knowledge of the content of the modules *Essentials of Finance* [WW3BWLFBV1] (for bachelor students) and *F1 (Finance)* [WW4BWLFBV1] (for master students) is assumed.

The total workload for this course is approximately 90 hours. For further information see German version.

Organizational issues
Zwischenpräsentation am 11.12.23, 16 Uhr und Abschlusspräsentation am 23.01.24, 17:30 Uhr, beides am Campus B (Geb. 09.21), Raum 209

V **Business Data Analytics** — **Seminar (S)**, **On-Site**
2540473, WS 23/24, 2 SWS, Language: German/English, Open in study portal

Content
wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

V **Master Seminar in Data Science and Machine Learning** — **Seminar (S)**, **Blended (On-Site/Online)**
2540510, WS 23/24, 2 SWS, Language: German, Open in study portal

V **Hospital Management** — **Block (B)**, **Online**
2550493, WS 23/24, 2 SWS, Language: German, Open in study portal

V **Seminar Human Resource Management (Master)** — **Seminar (S)**, **On-Site**
2573012, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V Seminar Human Resources and Organizations (Master)

2573013, WS 23/24, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim

The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload

The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature

Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

V Seminar Management Accounting - Special Topics

2579911, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 12 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

V Seminar Management Accounting - Sustainability Topics

2579919, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Note:

- Maximum of 8 students.

Organizational issues
Ort und Zeit werden noch bekannt gegeben bzw. über ILIAS

Literature
Will be announced in the course.

V Design Seminar: Digital Citizen Science

2500027, SS 2024, 2 SWS, Open in study portal

Seminar (S)

Content
TBA

V Affective User Research for Human-AI Interaction

2500036, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
User research aims to understand users' needs, behaviors, and attitudes to effectively inform the design and development of products or services. It is a key endeavor to learn how users experience digital technologies, what is working well and what is not, and identify gaps and future needs in order to personalize and improve the user experience. To design for positive user experiences, investigating affective user reactions (e.g., emotions, stress, flow) is of particular interest. Therefore, affective user research collects and analyzes behavioral data and affective reactions of users when engaging with products or services. With the growing amount of data and computing capabilities, artificial intelligence (AI) technologies are increasingly used in user research for the prediction of affective user states when interacting with digital technology.

The recent advances in artificial intelligence (AI), however, may not only support affective user research as a method of inquire, but it also has found its way into our daily lives as humans interact with it every day, for example, in form of recommendation engines on social media, in health applications, or as personal assistants based on large language models (LLMs) to receive text output for code completion, ideation, or writing. Interacting with AI-based digital technologies also triggers affective user reactions. However, these affective user reactions in Human-AI Interactions are yet to be understood.

In this seminar, participants will apply methods for affective user research on a particular type of Human-AI Interaction, the prompting of LLMs. LLM prompting is expected to become the up-and-coming form of interacting with AI in the future. To receive output from an LLM, users must send a prompt to the LLM. Given a prompt, an LLM responds incrementally with “tokens” (e.g., groups of letters, numbers, punctuation) which build the output. Structuring the prompt and receiving output influences the affective reactions of the user. Precisely, these user reactions should be investigated by the students participating in this seminar.

In the "Affective User Research for Human-AI Interaction" seminar, participating students will learn how to apply AI-based user research methods with a specific emphasis on the affective dimension when interacting with AI-based digital technologies. The goal of this seminar is to provide students with a unique set of skills in (1) quantitative data analysis, (2) knowledge about Human-AI Interaction and, in particular, LLM prompting, and (3) prediction of affective user states (e.g., emotions, stress) using state-of-the-art machine learning (ML) techniques. Students will leverage a dataset on Human-AI Interaction and gain in-depth knowledge from it as part of the seminar. The seminar emphasizes the importance of applying the aforementioned affective user research methods in an ethically compliant form. The core activities include:

- Learn the fundamentals of AI-based affective user research methods.
- Explore a dataset on Human-AI Interaction with the specific focus on the interplay of user behavior and affective user reactions.
- Developing AI-based supervised machine learning techniques for predicting user activities and affective user states.
- Present findings and insights to the seminar audience and discuss the results.

The seminar is held by Dr. Ivo Benke in cooperation with Dr. Lennard Schmidt. Both are experts from industry in the fields of affective user research, quantitative data analysis, and Human-AI Interaction.

Learning Objectives

- Understand the potential of combining user behavior and affective user reaction data for affective user research.
- Develop hands-on knowledge by applying AI-based affective user research methods on a real-world dataset.
- Develop a deeper understanding of a prominent form of Human-AI Interaction (e.g., LLM prompting).
- Deliver a presentation in a scientific context in front of an auditorium.

V **Human-Centered Systems Seminar: Engineering** — **Seminar (S)**, **Blended (On-Site/Online)**
2500125, SS 2024, 3 SWS, Language: English, Open in study portal

Content
Formerly known as "Current Topics in Digital Transformation"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the human-centered systems lab (Prof. Mädche). Students will work on a dedicated topic in the context of human-centered systems and apply a pre-defined research method. A broad spectrum of topics is offered every semester, topics may range from creating an experimental design, analyzing collected data, or systematically comparing existing software prototypes in a specific field of interest.

V **Master Seminar in Data Science and Machine Learning** — **Seminar (S)**
2540510, SS 2024, 2 SWS, Language: German/English, Open in study portal

V **User-Adaptive Systems Seminar** — **Seminar (S)**, **Blended (On-Site/Online)**
2540553, SS 2024, 2 SWS, Language: English, Open in study portal

Content
User-adaptive systems collect and analyze biosignals from users to recognize user states as a basis for adaptation. Thermic, mechanical, electric, acoustic, and optical signals are collected using sensors which are integrated in wearables, e.g. glasses, earphones, belts, or bracelets. The collected data is processed with analytics and machine learning techniques in order to determine short-term, evolving over time, and long-term user states in the form of user characteristics, affective-cognitive states, or behavior. Finally, the recognized user states are leveraged for realizing user-centric adaptations.

In this seminar, interdisciplinary teams of students design, develop, and evaluate a user-adaptive system prototype leveraging state-of-the-art hard- and software. This seminar follows an interdisciplinary approach. Students from the fields of computer science, information systems and industrial engineering & management collaborate in the prototype design, development, and evaluation.

The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (h-lab, Prof. Mädche). It is offered as part of the DFG-funded graduate school "KD2School: Designing Adaptive Systems for Economic Decisions" (https://kd2school.info/)

Learning objectives of the seminar

- Explain what a user-adaptive system is and how it can be conceptualized
- Suggest and evaluate different design solutions for addressing the identified problem
- Build a user-adaptive system prototype using state-of-the-art hard- and software
- Perform a user-centric evaluation of the user-adaptive system prototype

Prerequisites

Strong analytical abilities and profound software development skills are required.

Organizational issues
Termine werden bekannt gegeben

Literature
Required literature will be made available in the seminar.

V **Human-Centered Systems Seminar: Research** — **Seminar (S)**
2540557, SS 2024, 3 SWS, Language: English, Open in study portal — **Blended (On-Site/Online)**

Content
Formerly known as "Information Systems and Service Design Seminar"

With this seminar, we aim to provide students with the possibility to independently work on state-of-the-art research topics in addition to the knowledge gained in the lectures of the research group IS I (Prof. Mädche). The research group “Information Systems I” (IS I) headed by Prof. Mädche focuses in research, education, and innovation on designing interactive intelligent systems. It is positioned at the intersection of Information Systems and Human-Computer Interaction (HCI).

In the seminar, participants will get deeper insights in a contemporary research topic in the field of information systems, specifically interactive intelligent systems.

The actual seminar topics will be derived from current research activities of the research group. Our research assistants offer a rich set of topics from our research clusters (digital experience and participation, intelligent enterprise systems, or digital services design & innovation). Students can select among these topics individually depending on their personal interests. The seminar is carried out in the form of a literature-based thesis project. In the seminar, students will acquire the important methodological skills of running a systematic literature review.

Learning Objectives

- focus on a contemporary topic at the intersection of Information Systems and Human-Computer Interaction (HCI), specifically interactive intelligent systems
- carry out a structured literature search for a given topic
- aggregate the collected information in a suitable way to present and extract knowledge
- write a seminar thesis following academic writing standards
- deliver a presentation in a scientific context in front of an auditorium

Prerequisites

No specific prerequisites are required for the seminar.

Literature

Further literature will be made available in the seminar.

Organizational issues
Termine werden bekannt gegeben

V **Entrepreneurship Research** **Seminar (S)**
2545002, SS 2024, 2 SWS, Language: English, Open in study portal **On-Site**

Content
Content

In this course, the students choose from various relevant and current research topics in entrepreneurship and independently develop a topic that suits them in small teams. Initially, there is an introduction to standard methods such as systematic literature review, design science, qualitative and quantitative data analysis, and more. The seminar topic must be scientifically prepared and presented in 15-20 pages as part of a written elaboration. The seminar results are presented in a block event at the end of the semester (20 min + 10 min open discussion).

Learning Objectives

The foundations of independent scholarly work (literature review, argumentation + discussion, citation of literature sources, application of qualitative, quantitative, and simulation methods) are developed as part of the written elaboration. The competencies acquired in the seminar can be utilized in preparing for a potential master's thesis. Therefore, the seminar is mainly aimed at students who intend to write their thesis at the Chair of Entrepreneurship and Technology Management and wish to gain substantial experience in entrepreneurship research.

Organizational issues
Monday, 17.06.2024, 10.00-17.00
Thursday, 27.06.2024, 10.00-17.00
Thursday, 25.07.2024, 10.00-17.00

Registration is via the Wiwi-Portal.

Literature
Will be announced in the seminar.

V

Hospital Management

2550493, SS 2024, 2 SWS, Language: German, Open in study portal

Block (B)
Online

Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

The assessment consists of attendance and a presentation or a case study.

Organizational issues
Das Seminar wird als Blockveranstaltung stattfinden. Die Termine werden bei der Anmeldung über das Wiwi-Portal bekanntgegeben.

V

Seminar Management Accounting - Special Topics

2579909, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

V

Seminar Management Accounting - Sustainability Topics

2579919, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources.

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a “Prüfungsleistung anderer Art” (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Note:

- Maximum of 8 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

T 7.394 Course: Seminar in Economic Policy [T-WIWI-102789]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101514 - Innovation Economics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Exams			
WT 23/24	7900212	Seminar in Economic Policy	Ott
ST 2024	7900051	Seminar in Economic Policy	Ott

Competence Certificate
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted scored examinations (Essay 50%, 40% oral presentation, active participation 10%).

Prerequisites
None

Recommendation
At least one of the lectures "Theory of Endogenous Growth" or "Innovation Theory and Policy" should be attended in advance, if possible.

T 7.395 Course: Seminar in Economics A (Master) [T-WIWI-103478]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2500024	Wirtschaftstheoretisches Seminar IV (Master)	2 SWS	Seminar /	Puppe, Kretz, Ammann
WT 23/24	2500032	Disruption and the Digital Economy: Markets, Strategies, and Society (Master)	2 SWS	Seminar /	Rosar
WT 23/24	2500051	The Challenges of the Mobility Transition in Urban Areas - Which Contributions Can Be Expected from the Serious Game "MobileCityGame"?	2 SWS	Seminar	Szimba
WT 23/24	2500052	Seminar on Topics in Digital Economics	2 SWS	Seminar /	Reiß, Hillenbrand, Potarca
WT 23/24	2520367	Strategische Entscheidungen		Seminar	Ehrhart
WT 23/24	2520405	Topics in Experimental Economics		Seminar /	Reiß, Peters
WT 23/24	2520500	Workshop on Economics, Finance and Statistics	2 SWS	Seminar	Puppe, Brumm, Nieken, Ott, Reiß, Ruckes, Schienle, Szech, Uhrig-Homburg, Wigger, Krüger
WT 23/24	2520563	Wirtschaftstheoretisches Seminar III (Master)	2 SWS	Seminar /	Puppe, Ammann, Kretz
WT 23/24	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter
WT 23/24	2560130	Seminar Public Finance	2 SWS	Seminar /	Wigger, Setio, Schmelzer
WT 23/24	2560142	Lying and Cheating in Economic Experiments (Master)	2 SWS	Seminar /	Rau
WT 23/24	2560143	AI and Digitization for Society (Master)	2 SWS	Seminar /	Zhao
WT 23/24	2560282	Seminar in Economic Policy	2 SWS	Seminar /	Ott, Assistenten
WT 23/24	2560400	Seminar in Macroeconomics I	2 SWS	Seminar /	Brumm, Krause, Pegorari, Hußmann
WT 23/24	2560401	Seminar in Macroeconomics II	2 SWS	Seminar /	Brumm, Krause, Pegorari, Hußmann
WT 23/24	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba
ST 2024	2500004	Predictive Data Analytics - An Introduction to Statistical Machine Learning	2 SWS	Seminar /	Schienle, Lerch
ST 2024	2520367	Strategische Entscheidungen	2 SWS	Seminar /	Ehrhart
ST 2024	2520536	Seminar in Economic Theory II	2 SWS	Seminar /	Ammann, Kretz, Okulicz
ST 2024	2520563	Wirtschaftstheoretisches Seminar III	2 SWS	Seminar /	Ammann, Kretz, Okulicz
ST 2024	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Buse, Rüter, Bracher
ST 2024	2560130	Seminar Public Finance	2 SWS	Block /	Wigger, Schmelzer

ST 2024	2560282	Seminar in economic policy	2 SWS	Seminar / 🗣	Ott, Assistenten
ST 2024	2560400	Seminar in Macroeconomics I	2 SWS	Seminar / 🏵	Brumm, Krause, Pegorari
ST 2024	2560552	Seminar Shaping AI and Digitization for Society (Master)	2 SWS	Seminar / 🏵	Zhao
Exams					
WT 23/24	7900015	Seminar Disruption in the Digital Economy (Master)			Puppe
WT 23/24	7900139	Selected Aspects of European Transport Planning and Modelling			Mitusch
WT 23/24	7900140	Seminar Lying and Cheating in Economic Experiments (Master)			Puppe
WT 23/24	7900212	Seminar in Economic Policy			Ott
WT 23/24	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)			Schienle
WT 23/24	7900293	Seminar: Debt The First 5000 Years (Master)			Puppe
WT 23/24	7900296	Seminar AI and Digitization for Society (Master)			Puppe
WT 23/24	7900354	Die Herausforderungen der Mobilitätswende im urbanen Bereich - welche Beiträge kann das Serious Game "MobileCityGame" liefern?			Mitusch
WT 23/24	7900361	Seminar on Topics in Digital Economics			Reiß, Hillenbrand
WT 23/24	79100005	Topics in Experimental Economics			Reiß
WT 23/24	79sefi2	Seminar Public Finance A (Master)			Wigger
ST 2024	7900051	Seminar in Economic Policy			Ott
ST 2024	7900131	Shaping AI and Digitization for Society (Master)			Puppe
ST 2024	7900164	Seminar in Economics (Bachelor)			Mitusch
ST 2024	79100005	Topics in Experimental Economics			Reiß

Legend: 🖥 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Disruption and the Digital Economy: Markets, Strategies, and Society (Master)** **Seminar (S) On-Site**
2500032, WS 23/24, 2 SWS, Language: English, Open in study portal

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering, Economathematics or Digital Economics.

Objective: The student investigates a market that was (or might be) disrupted from a strategic perspective. Students work in groups. For more information, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of microeconomics and game theory may be helpful.

Organizational issues
Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 27.10.2023, 14.00 - 15.30 Uhr, Geb. 01.85, KD2Lab (1. OG über Außentreppe), Teamraum

Präsentationen: 15.01.2024 14.00 - 18.00 Uhr, Geb. 01.85, KD2Lab (1. OG über Außentreppe), Teamraum

V Topics in Experimental Economics
2520405, WS 23/24, SWS, Language: English, Open in study portal

Seminar (S)
Online

Organizational issues
(im WS2021/22 online; sonst Blockseminar; Blücherstraße 17); Termine werden separat bekannt gegeben

Literature
Als Pflichtliteratur dienen ausgewählte Paper.

V Topics in Econometrics
2521310, WS 23/24, 2 SWS, Language: German, Open in study portal

Seminar (S)

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V Lying and Cheating in Economic Experiments (Master)
2560142, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 24.10.23, 15.00 - 16.30 h, Geb. 01.85, KD2Lab (1. OG über Außentreppe), Teamraum

Präsentationen: 08.01.2024, 14.00 - 18.00 h, Geb. 01.85, KD2Lab (1. OG über Außentreppe), Teamraum

V AI and Digitization for Society (Master)
2560143, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 25.10.2023, 11.00 - 12.00 (online)

Presentations: 12.01.2024, 14.00 - 18.00, Geb. 01.85, KD2Lab (1. OG über Außentreppe), Teamraum

V Predictive Data Analytics - An Introduction to Statistical Machine Learning
2500004, SS 2024, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V **Advanced Topics in Econometrics** — **Seminar (S)**
2521310, SS 2024, 2 SWS, Language: German/English, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V **Seminar Public Finance** — **Block (B)** **Blended (On-Site/Online)**
2560130, SS 2024, 2 SWS, Language: German, Open in study portal

Content
See German version.

Organizational issues
Termine werden bekannt gegeben.

Literature
Literatur wird zu Beginn des jeweiligen Seminars vorgestellt.

V **Seminar Shaping AI and Digitization for Society (Master)** — **Seminar (S)** **Blended (On-Site/Online)**
2560552, SS 2024, 2 SWS, Language: English, Open in study portal

Content
Participation will be limited to 12 students.

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar via the platform https://portal.wiwi.kit.edu/Seminare is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Grading: Seminar Papers of 8–10 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (60%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Registration via WiWi-Portal

Blockveranstaltungen:

Introductory Meeting April 17, 11.00 - 12.00 Uhr (online)

Seminar Presentations June 14, 2024, 14.00 - 18.30 Uhr (in person)

T 7.396 Course: Seminar in Economics B (Master) [T-WIWI-103477]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2500024	Wirtschaftstheoretisches Seminar IV (Master)	2 SWS	Seminar /	Puppe, Kretz, Ammann
WT 23/24	2500051	The Challenges of the Mobility Transition in Urban Areas - Which Contributions Can Be Expected from the Serious Game "MobileCityGame"?	2 SWS	Seminar	Szimba
WT 23/24	2500052	Seminar on Topics in Digital Economics	2 SWS	Seminar /	Reiß, Hillenbrand, Potarca
WT 23/24	2520367	Strategische Entscheidungen		Seminar	Ehrhart
WT 23/24	2520405	Topics in Experimental Economics		Seminar /	Reiß, Peters
WT 23/24	2520500	Workshop on Economics, Finance and Statistics	2 SWS	Seminar	Puppe, Brumm, Nieken, Ott, Reiß, Ruckes, Schienle, Szech, Uhrig-Homburg, Wigger, Krüger
WT 23/24	2520563	Wirtschaftstheoretisches Seminar III (Master)	2 SWS	Seminar /	Puppe, Ammann, Kretz
WT 23/24	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter
WT 23/24	2560130	Seminar Public Finance	2 SWS	Seminar /	Wigger, Setio, Schmelzer
WT 23/24	2560142	Lying and Cheating in Economic Experiments (Master)	2 SWS	Seminar /	Rau
WT 23/24	2560282	Seminar in Economic Policy	2 SWS	Seminar /	Ott, Assistenten
WT 23/24	2560400	Seminar in Macroeconomics I	2 SWS	Seminar /	Brumm, Krause, Pegorari, Hußmann
WT 23/24	2560401	Seminar in Macroeconomics II	2 SWS	Seminar /	Brumm, Krause, Pegorari, Hußmann
WT 23/24	2561208	Selected aspects of European transport planning and -modelling	2 SWS	Seminar	Szimba
ST 2024	2500004	Predictive Data Analytics - An Introduction to Statistical Machine Learning	2 SWS	Seminar /	Schienle, Lerch
ST 2024	2520367	Strategische Entscheidungen	2 SWS	Seminar /	Ehrhart
ST 2024	2520536	Seminar in Economic Theory II	2 SWS	Seminar /	Ammann, Kretz, Okulicz
ST 2024	2520563	Wirtschaftstheoretisches Seminar III	2 SWS	Seminar /	Ammann, Kretz, Okulicz
ST 2024	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Buse, Rüter, Bracher
ST 2024	2560130	Seminar Public Finance	2 SWS	Block /	Wigger, Schmelzer
ST 2024	2560259	Organisation and Management of Development Projects	2 SWS	Seminar /	Sieber
ST 2024	2560282	Seminar in economic policy	2 SWS	Seminar /	Ott, Assistenten

ST 2024	2560400	Seminar in Macroeconomics I	2 SWS	Seminar /	Brumm, Krause, Pegorari
ST 2024	2560552	Seminar Shaping AI and Digitization for Society (Master)	2 SWS	Seminar /	Zhao
Exams					
WT 23/24	7900015	Seminar Disruption in the Digital Economy (Master)			Puppe
WT 23/24	7900139	Selected Aspects of European Transport Planning and Modelling			Mitusch
WT 23/24	7900140	Seminar Lying and Cheating in Economic Experiments (Master)			Puppe
WT 23/24	7900212	Seminar in Economic Policy			Ott
WT 23/24	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)			Schienle
WT 23/24	7900293	Seminar: Debt The First 5000 Years (Master)			Puppe
WT 23/24	7900296	Seminar AI and Digitization for Society (Master)			Puppe
WT 23/24	7900354	Die Herausforderungen der Mobilitätswende im urbanen Bereich - welche Beiträge kann das Serious Game "MobileCityGame" liefern?			Mitusch
WT 23/24	7900361	Seminar on Topics in Digital Economics			Reiß, Hillenbrand
WT 23/24	79100005	Topics in Experimental Economics			Reiß
WT 23/24	79sefi3	Seminar Public Finance B (Master)			Wigger
ST 2024	7900051	Seminar in Economic Policy			Ott
ST 2024	7900131	Shaping AI and Digitization for Society (Master)			Puppe
ST 2024	7900164	Seminar in Economics (Bachelor)			Mitusch
ST 2024	79100005	Topics in Experimental Economics			Reiß

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Topics in Experimental Economics** **Seminar (S) Online**
2520405, WS 23/24, SWS, Language: English, Open in study portal

Organizational issues
(im WS2021/22 online; sonst Blockseminar; Blücherstraße 17); Termine werden separat bekannt gegeben

Literature
Als Pflichtliteratur dienen ausgewählte Paper.

V **Topics in Econometrics** **Seminar (S)**
2521310, WS 23/24, 2 SWS, Language: German, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V **Lying and Cheating in Economic Experiments (Master)**
2560142, WS 23/24, 2 SWS, Language: English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Application is possible via https://portal.wiwi.kit.edu/Seminare

Kick-off: 24.10.23, 15.00 - 16.30 h, Geb. 01.85, KD2Lab (1. OG über Außentreppe), Teamraum

Präsentationen: 08.01.2024, 14.00 - 18.00 h, Geb. 01.85, KD2Lab (1. OG über Außentreppe), Teamraum

V **Predictive Data Analytics - An Introduction to Statistical Machine Learning**
2500004, SS 2024, 2 SWS, Language: German/English, Open in study portal
Seminar (S)
On-Site

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V **Advanced Topics in Econometrics**
2521310, SS 2024, 2 SWS, Language: German/English, Open in study portal
Seminar (S)

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V **Seminar Public Finance**
2560130, SS 2024, 2 SWS, Language: German, Open in study portal
Block (B)
Blended (On-Site/Online)

Content
See German version.

Organizational issues
Termine werden bekannt gegeben.

Literature
Literatur wird zu Beginn des jeweiligen Seminars vorgestellt.

V **Seminar Shaping AI and Digitization for Society (Master)**
2560552, SS 2024, 2 SWS, Language: English, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
Participation will be limited to 12 students.

For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar via the platform https://portal.wiwi.kit.edu/Seminare is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Grading: Seminar Papers of 8–10 pages are to be handed in.

Students' grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (60%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Organizational issues
Registration via WiWi-Portal

Blockveranstaltungen:

Introductory Meeting April 17, 11.00 - 12.00 Uhr (online)

Seminar Presentations June 14, 2024, 14.00 - 18.30 Uhr (in person)

T 7.397 Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

Responsible: Fachvertreter ingenieurwissenschaftlicher Fakultäten
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Competence Certificate
See German version.

Prerequisites
See module description.

Recommendation
None

T 7.398 Course: Seminar in Informatics A (Master) [T-WIWI-103479]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2400125	Security and Privacy Awareness	2 SWS	Seminar /	Seidel-Saul, Volkamer, Boehm, Aldag, Veit
WT 23/24	2500044	Machine Learning on Graphs (Master)		Seminar /	Shao, Färber
WT 23/24	2513100	Seminar Data-driven Simulation for Industrial Systems (Master)	2 SWS	Seminar /	Lazarova-Molnar, Götz, Khodadadi
WT 23/24	2513313	Seminar Linked Data and the Semantic Web (Master)	3 SWS	Seminar /	Färber, Käfer, Braun
WT 23/24	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/	Färber, Höllig, Thoma
WT 23/24	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/	Färber, Höllig, Thoma
WT 23/24	2513451	Seminar Cooperative Autonomous Vehicles (Master)	2 SWS	Seminar /	Vinel
WT 23/24	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar /	Zöllner, Daaboul
ST 2024	2513103	Seminar Digital Twins (Master)	2 SWS	Seminar	Lazarova-Molnar, Jungmann
ST 2024	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar /	Oberweis, Forell, Frister, Fritsch, Rybinski, Schreiber, Schüler, Ullrich
ST 2024	2513309	Seminar Knowledge Discovery and Data Mining (Master)	3 SWS	Seminar /	Färber, Noullet, Saier, Popovic, Qu , Shao, Käfer
ST 2024	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar /	Färber, Käfer, Thoma
ST 2024	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak
ST 2024	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak
ST 2024	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar /	Schneider, Zöllner, Daaboul
ST 2024	2513553	Seminar E-Voting (Master)	2 SWS	Seminar /	Beckert, Müller-Quade, Volkamer, Kirsten, Hilt, Dörre
Exams					
WT 23/24	7900035	Seminar Data-driven Simulation for Industrial Systems (Master)			Lazarova-Molnar
WT 23/24	7900040	Machine Learning on Graphs (Master)			Färber
WT 23/24	7900069	Engineering Seminar: Human-Centered Systems			Mädche
WT 23/24	7900094	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev
WT 23/24	7900102	Advanced Lab Information Service Engineering (Master)			Sack
WT 23/24	7900119	Seminar Cognitive Automobiles and Robots			Zöllner

WT 23/24	7900121	Security and Privacy Awareness	Volkamer
WT 23/24	7900233	Research Seminar: Human-Centered Systems	Mädche
WT 23/24	7900279	Seminar Cooperative Autonomous Vehicles (Master)	Vinel
WT 23/24	7900304	Seminar Linked Data and the Semantic Web (Master)	Käfer
WT 23/24	7900356	Seminar Real-World Challenges in Data Science and Analytics (Master)	Sure-Vetter, Färber
ST 2024	7900088	Seminar Business Information Systems (Master)	Oberweis
ST 2024	7900190	Human-Centered Systems Seminar: Engineering	Mädche
ST 2024	7900202	Seminar Knowledge Discovery and Data Mining (Master)	Käfer
ST 2024	7900261	Human-Centered Systems Seminar: Research	Mädche
ST 2024	7900301	Seminar Modeling and Simulation	Lazarova-Molnar
ST 2024	7900305	Seminar Digital Twins (Master)	Lazarova-Molnar

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.

Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Security and Privacy Awareness**
2400125, WS 23/24, 2 SWS, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Note: The link to enrol is for every student, regardless of the study background!

Dates:

- Kick-Off : 23.10.23 14:00 o'clock, Room 1C-03, building 5.20
- First version: 07.01.24
- Final version: 17.02.24
- Presentation: CW 12

Topics will be assigned after the kick-off.

Consider that legal-focused topics require you to speak and understand German legal texts.

Topics:

1: Literature review on reporting obligations / information security incidents (literature - seminar

2: Privacy Awareness with electronic patient file

4: Ethical analysis of so-called attacker studies that gather security awareness data in public space.

5: Collecting data: The boundaries of consent

Further Topics TBA!

ATTENTION: The seminar is only for MASTER students!

V **Machine Learning on Graphs (Master)**
2500044, WS 23/24, SWS, Language: English, Open in study portal
Seminar (S)
On-Site

Content
Graph representation learning deals with capturing and understanding the complex relationships and patterns inherent in graph-structured data. It focuses on developing techniques and algorithms to extract meaningful representations from graphs, enabling tasks such as node classification, link prediction, community detection, and graph generation.
This seminar will cover the fundamental concepts of graph representation learning, such as knowledge graphs, graph theory, and graph spectral theory. Additionally, you will have the chance to engage in collaborative reading of recent technical reports and research papers with your peers, encompassing machine learning algorithms pertaining to large language models, knowledge embedding, and social attribute prediction.

V **Seminar Linked Data and the Semantic Web (Master)**
2513313, WS 23/24, 3 SWS, Language: German/English, Open in study portal
Seminar (S)
On-Site

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V

Seminar Real-World Challenges in Data Science and Analytics (Bachelor)

2513314, WS 23/24, 3 SWS, Language: German/English, Open in study portal

On-Site

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V

Seminar Real-World Challenges in Data Science and Analytics (Master)

2513315, WS 23/24, 3 SWS, Language: German/English, Open in study portal

On-Site

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V

Seminar Cognitive Automobiles and Robots (Master)

2513500, WS 23/24, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V

Seminar Digital Twins (Master)

2513103, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
Name: Digital Twins (Master)

Size: 10 students (with 10 different topics)

Workload:

- 2 Lectures
- One presentation delivered + attendance of the other students' presentations
- One report

Responsible Persons: Michelle Jungmann, Sanja Lazarova-Molnar

Deliverables for Grade:

- 1 report per student and topic (7-8 pages, IEEE Template, usage of Reference Manager – Zotero or EndNote)
- 25 min presentation per student plus 20 min discussion (focus on the presentation topic + presentation skills) = 45 minutes for each student

Credits: 3 credits

Format/ Structure of the Seminar:

- 2 lectures on beginning of semester
- Students have 1 week time to provide a priority list of 5 presentation topics, distribution will be decided based on first come – first serve, ensuring that core topics are covered
- Students have time to work on the report and presentation during the semester
- Submission of all reports will be required 2 months after the intro lecture
- Presentations are done in blocks of 2 students per class, starting mid-June, presentations will be submitted at the day of the scheduled presentation

Description:

The seminar focuses on Digital Twins and data-driven modeling, with an additional goal of improving scientific research and presentation skills for Master students. The seminar targets different topics around the structure and function of Digital Twins as well as their use cases in areas like manufacturing, energy systems, healthcare and others. Additional aspects that we consider in this seminar are cognitive Digital Twins, as well as how data and human expertise can be combined in Digital Twins.

The seminar is structured as a literature review seminar so that each student can select a topic out of a predefined set. The student then writes a paper, as well as delivers a presentation on that topic, based on the provided starting literature and additional research.

Topics:

1. What is a Digital Twin? (core topic)

References:

- Fuller, Aidan, et al. "Digital twin: Enabling technologies, challenges and open research." *IEEE access* 8 (2020): 108952-108971.
- Tao, Fei, et al. "Digital twin in industry: State-of-the-art." *IEEE Transactions on industrial informatics* 15.4 (2018): 2405-2415.
- Mihai, Stefan, et al. "Digital twins: A survey on enabling technologies, challenges, trends and future prospects." *IEEE Communications Surveys & Tutorials* (2022).

2. Digital Twins Architectures (core topic)

References:

- Ashtari Talkhestani, Behrang, et al. "An architecture of an intelligent digital twin in a cyber-physical production system." *at-Automatisierungstechnik* 67.9 (2019): 762-782.
- Harper, K. Eric, Somayeh Malakuti, and Christopher Ganz. "Digital twin architecture and standards." (2019).
- Minerva, Roberto, Gyu Myoung Lee, and Noel Crespi. "Digital twin in the IoT context: A survey on technical features, scenarios, and architectural models." *Proceedings of the IEEE* 108.10 (2020): 1785-1824.

3. Validation of Digital Twins (core topic)

References:

- Worden, K., et al. "On digital twins, mirrors, and virtualizations: Frameworks for model verification and validation." *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering* 6.3 (2020): 030902.
- Hua, Edward Y., Sanja Lazarova-Molnar, and Deena P. Francis. "Validation of Digital Twins: Challenges and Opportunities." *2022 Winter Simulation Conference (WSC)*. IEEE, 2022.
- Darvishi, Hossein, Domenico Ciuonzo, and Pierluigi Salvo Rossi. "Exploring a modular architecture for sensor validation in digital twins." *2022 IEEE Sensors*. IEEE, 2022.

4. Modeling Formalisms for Digital Twins (core topic)

References:

- Magargle, Ryan, et al. "A Simulation-Based Digital Twin for Model-Driven Health Monitoring and Predictive Maintenance of an Automotive Braking System." *Modelica*. 2017.
- Liu, Qing, et al. "A comparative study on digital twin models." *AIP Conference Proceedings*. Vol. 2073. No. 1. AIP Publishing, 2019.
- Li, Haobin, et al. "Three Carriages Driving the Development of Intelligent Digital Twins-Simulation Plus Optimization and Learning." *2021 Winter Simulation Conference (WSC)*. IEEE, 2021.

5. Digital Twins Data Requirements (core topic)

References:

- Durão, Luiz Fernando CS, et al. "Digital twin requirements in the context of industry 4.0." *Product Lifecycle Management to Support Industry 4.0: 15th IFIP WG 5.1 International Conference, PLM 2018, Turin, Italy, July 2-4, 2018, Proceedings 15*. Springer International Publishing, 2018.
- Qi, Qinglin, and Fei Tao. "Digital twin and big data towards smart manufacturing and industry 4.0: 360 degree comparison." *Ieee Access* 6 (2018): 3585-3593.

6. Digital Twins for Manufacturing Systems

References:

- Zhang, Chenyuan, et al. "A reconfigurable modeling approach for digital twin-based manufacturing system." *Procedia Cirp* 83 (2019): 118-125.
- Kritzinger, Werner, et al. "Digital Twin in manufacturing: A categorical literature review and classification." *Ifac-PapersOnline* 51.11 (2018): 1016-1022.
- Jaensch, Florian, et al. "Digital twins of manufacturing systems as a base for machine learning." *2018 25th International conference on mechatronics and machine vision in practice (M2VIP)*. IEEE, 2018.

7. Digital Twins for Energy Systems

References:

- Steindl, Gernot, et al. "Generic digital twin architecture for industrial energy systems." *Applied Sciences* 10.24 (2020): 8903.
- Granacher, Julia, et al. "Overcoming decision paralysis—A digital twin for decision making in energy system design." *Applied Energy* 306 (2022): 117954.
- Palensky, Peter, et al. "Digital twins and their use in future power systems." *Digital Twin* 1 (2022): 4.

8. Digital Twins in Healthcare

References:

- Alazab, Mamoun, et al. "Digital twins for healthcare 4.0-recent advances, architecture, and open challenges." *IEEE Consumer Electronics Magazine* (2022).
- Croatti, Angelo, et al. "On the integration of agents and digital twins in healthcare." *Journal of Medical Systems* 44 (2020): 1-8.
- Erol, Tolga, Arif Furkan Mendi, and Dilara Doğan. "The digital twin revolution in healthcare." *2020 4th international symposium on multidisciplinary studies and innovative technologies (ISMSIT)*. IEEE, 2020.

9. Digital Twins of City Infrastructures (in Smart Cities)

References:

- Deren, Li, Yu Wenbo, and Shao Zhenfeng. "Smart city based on digital twins." *Computational Urban Science* 1 (2021): 1-11.
- Deng, Tianhu, Keren Zhang, and Zuo-Jun Max Shen. "A systematic review of a digital twin city: A new pattern of urban governance toward smart cities." *Journal of Management Science and Engineering* 6.2 (2021): 125-134.
- Mylonas, Georgios, et al. "Digital twins from smart manufacturing to smart cities: A survey." *Ieee Access* 9 (2021): 143222-143249.

10. Digital Twins in Logistics

References:

- Moshood, Taofeeq D., et al. "Digital twins driven supply chain visibility within logistics: A new paradigm for future logistics." *Applied System Innovation* 4.2 (2021): 29.
- Agalianos, K., et al. "Discrete event simulation and digital twins: review and challenges for logistics." *Procedia Manufacturing* 51 (2020): 1636-1641.
- Korth, Benjamin, Christian Schwede, and Markus Zajac. "Simulation-ready digital twin for realtime management of logistics systems." *2018 IEEE international conference on big data (big data)*. IEEE, 2018.

11. Cognitive Digital Twins

References:

- Al Faruque, Mohammad Abdullah, et al. "Cognitive digital twin for manufacturing systems." *2021 Design, Automation & Test in Europe Conference & Exhibition (DATE)*. IEEE, 2021.

- Zhang, Nan, Rami Bahsoon, and Georgios Theodoropoulos. "Towards engineering cognitive digital twins with self-awareness." *2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE, 2020.
- Zheng, Xiaochen, Jinzhi Lu, and Dimitris Kiritsis. "The emergence of cognitive digital twin: vision, challenges and opportunities." *International Journal of Production Research* 60.24 (2022): 7610-7632.

12. Fusing Data and Human Expert Knowledge in Digital Twins

References:

- Kulkarni, Vinay, Souvik Barat, and Tony Clark. "Towards adaptive enterprises using digital twins." *2019 winter simulation conference (WSC)*. IEEE, 2019.
- Vogel-Heuser, Birgit, et al. "Potential for combining semantics and data analysis in the context of digital twins." *Philosophical Transactions of the Royal Society A* 379.2207 (2021): 20200368.
- Todorovski, Ljupčo, and Sašo Džeroski. "Integrating knowledge-driven and data-driven approaches to modeling." *ecological modelling* 194.1-3 (2006): 3-13.

V Seminar Knowledge Discovery and Data Mining (Master)

2513309, SS 2024, 3 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science

The exact dates and information for registration will be announced at the event page.

Organizational issues
Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu/.

Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

Literature
Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Seminar Data Science & Real-time Big Data Analytics (Master)

2513311, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues
Questions are answered via the e-mail address sem-ep@fzi.de.

V Cognitive Automobiles and Robots

2513500, SS 2024, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Seminar E-Voting (Master)

2513553, SS 2024, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
What should a voting procedure fulfill? When is a voting procedure secure? Which components need to be examined? Which methods can be used to investigate this?

Cryptographic voting procedures and algorithmic voting (counting) procedures are examined from different perspectives (cryptographic methods, formal correctness, human factors).

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website (https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

Organizational issues
Die Anmeldung für das Seminar ist bis zum 17.04. über https://portal.wiwi.kit.edu/ys/8037 möglich.

T 7.399 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

Responsible: Professorenschaft des Instituts AIFB
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2400125	Security and Privacy Awareness	2 SWS	Seminar /	Seidel-Saul, Volkamer, Boehm, Aldag, Veit
WT 23/24	2500044	Machine Learning on Graphs (Master)		Seminar /	Shao, Färber
WT 23/24	2513100	Seminar Data-driven Simulation for Industrial Systems (Master)	2 SWS	Seminar /	Lazarova-Molnar, Götz, Khodadadi
WT 23/24	2513313	Seminar Linked Data and the Semantic Web (Master)	3 SWS	Seminar /	Färber, Käfer, Braun
WT 23/24	2513314	Seminar Real-World Challenges in Data Science and Analytics (Bachelor)	3 SWS	/	Färber, Höllig, Thoma
WT 23/24	2513315	Seminar Real-World Challenges in Data Science and Analytics (Master)	3 SWS	/	Färber, Höllig, Thoma
WT 23/24	2513451	Seminar Cooperative Autonomous Vehicles (Master)	2 SWS	Seminar /	Vinel
WT 23/24	2513500	Seminar Cognitive Automobiles and Robots (Master)	2 SWS	Seminar /	Zöllner, Daaboul
ST 2024	2513103	Seminar Digital Twins (Master)	2 SWS	Seminar	Lazarova-Molnar, Jungmann
ST 2024	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar /	Oberweis, Forell, Frister, Fritsch, Rybinski, Schreiber, Schüler, Ullrich
ST 2024	2513309	Seminar Knowledge Discovery and Data Mining (Master)	3 SWS	Seminar /	Färber, Noullet, Saier, Popovic, Qu , Shao, Käfer
ST 2024	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar /	Färber, Käfer, Thoma
ST 2024	2513403	Seminar Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak
ST 2024	2513405	Seminar Emerging Trends in Digital Health (Master)	2 SWS	Seminar /	Sunyaev, Toussaint, Brecker, Danylak
ST 2024	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar /	Schneider, Zöllner, Daaboul
ST 2024	2513553	Seminar E-Voting (Master)	2 SWS	Seminar /	Beckert, Müller-Quade, Volkamer, Kirsten, Hilt, Dörre
Exams					
WT 23/24	7500175	Seminar: Energy Informatics			Wagner, Ueckerdt
WT 23/24	7900035	Seminar Data-driven Simulation for Industrial Systems (Master)			Lazarova-Molnar
WT 23/24	7900040	Machine Learning on Graphs (Master)			Färber
WT 23/24	7900094	Seminar Selected Issues in Critical Information Infrastructures (Master)			Sunyaev
WT 23/24	7900102	Advanced Lab Information Service Engineering (Master)			Sack
WT 23/24	7900119	Seminar Cognitive Automobiles and Robots			Zöllner

WT 23/24	7900121	Security and Privacy Awareness	Volkamer
WT 23/24	7900279	Seminar Cooperative Autonomous Vehicles (Master)	Vinel
WT 23/24	7900304	Seminar Linked Data and the Semantic Web (Master)	Käfer
WT 23/24	7900356	Seminar Real-World Challenges in Data Science and Analytics (Master)	Sure-Vetter, Färber
ST 2024	7900088	Seminar Business Information Systems (Master)	Oberweis
ST 2024	7900202	Seminar Knowledge Discovery and Data Mining (Master)	Käfer
ST 2024	7900301	Seminar Modeling and Simulation	Lazarova-Molnar
ST 2024	7900305	Seminar Digital Twins (Master)	Lazarova-Molnar

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Security and Privacy Awareness**
2400125, WS 23/24, 2 SWS, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Note: The link to enrol is for every student, regardless of the study background!

Dates:

- Kick-Off : 23.10.23 14:00 o'clock, Room 1C-03, building 5.20
- First version: 07.01.24
- Final version: 17.02.24
- Presentation: CW 12

Topics will be assigned after the kick-off.

Consider that legal-focused topics require you to speak and understand German legal texts.

Topics:

1: Literature review on reporting obligations / information security incidents (literature - seminar

2: Privacy Awareness with electronic patient file

4: Ethical analysis of so-called attacker studies that gather security awareness data in public space.

5: Collecting data: The boundaries of consent

Further Topics TBA!

ATTENTION: The seminar is only for MASTER students!

V

Machine Learning on Graphs (Master)

2500044, WS 23/24, SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
Graph representation learning deals with capturing and understanding the complex relationships and patterns inherent in graph-structured data. It focuses on developing techniques and algorithms to extract meaningful representations from graphs, enabling tasks such as node classification, link prediction, community detection, and graph generation.
This seminar will cover the fundamental concepts of graph representation learning, such as knowledge graphs, graph theory, and graph spectral theory. Additionally, you will have the chance to engage in collaborative reading of recent technical reports and research papers with your peers, encompassing machine learning algorithms pertaining to large language models, knowledge embedding, and social attribute prediction.

V

Seminar Linked Data and the Semantic Web (Master)

2513313, WS 23/24, 3 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

V Seminar Real-World Challenges in Data Science and Analytics (Bachelor)

2513314, WS 23/24, 3 SWS, Language: German/English, Open in study portal

On-Site

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V Seminar Real-World Challenges in Data Science and Analytics (Master)

2513315, WS 23/24, 3 SWS, Language: German/English, Open in study portal

On-Site

Content
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

The exact dates and information for registration will be announced at the course page.

V Seminar Cognitive Automobiles and Robots (Master)

2513500, WS 23/24, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Seminar Digital Twins (Master)

2513103, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
Name: Digital Twins (Master)

Size: 10 students (with 10 different topics)

Workload:

- 2 Lectures
- One presentation delivered + attendance of the other students' presentations
- One report

Responsible Persons: Michelle Jungmann, Sanja Lazarova-Molnar

Deliverables for Grade:

- 1 report per student and topic (7-8 pages, IEEE Template, usage of Reference Manager – Zotero or EndNote)
- 25 min presentation per student plus 20 min discussion (focus on the presentation topic + presentation skills) = 45 minutes for each student

Credits: 3 credits

Format/ Structure of the Seminar:

- 2 lectures on beginning of semester
- Students have 1 week time to provide a priority list of 5 presentation topics, distribution will be decided based on first come – first serve, ensuring that core topics are covered
- Students have time to work on the report and presentation during the semester
- Submission of all reports will be required 2 months after the intro lecture
- Presentations are done in blocks of 2 students per class, starting mid-June, presentations will be submitted at the day of the scheduled presentation

Description:

The seminar focuses on Digital Twins and data-driven modeling, with an additional goal of improving scientific research and presentation skills for Master students. The seminar targets different topics around the structure and function of Digital Twins as well as their use cases in areas like manufacturing, energy systems, healthcare and others. Additional aspects that we consider in this seminar are cognitive Digital Twins, as well as how data and human expertise can be combined in Digital Twins.

The seminar is structured as a literature review seminar so that each student can select a topic out of a predefined set. The student then writes a paper, as well as delivers a presentation on that topic, based on the provided starting literature and additional research.

Topics:

1. What is a Digital Twin? (core topic)

References:

- Fuller, Aidan, et al. "Digital twin: Enabling technologies, challenges and open research." *IEEE access* 8 (2020): 108952-108971.
- Tao, Fei, et al. "Digital twin in industry: State-of-the-art." *IEEE Transactions on industrial informatics* 15.4 (2018): 2405-2415.
- Mihai, Stefan, et al. "Digital twins: A survey on enabling technologies, challenges, trends and future prospects." *IEEE Communications Surveys & Tutorials* (2022).

2. Digital Twins Architectures (core topic)

References:

- Ashtari Talkhestani, Behrang, et al. "An architecture of an intelligent digital twin in a cyber-physical production system." *at-Automatisierungstechnik* 67.9 (2019): 762-782.
- Harper, K. Eric, Somayeh Malakuti, and Christopher Ganz. "Digital twin architecture and standards." (2019).
- Minerva, Roberto, Gyu Myoung Lee, and Noel Crespi. "Digital twin in the IoT context: A survey on technical features, scenarios, and architectural models." *Proceedings of the IEEE* 108.10 (2020): 1785-1824.

3. Validation of Digital Twins (core topic)

References:

- Worden, K., et al. "On digital twins, mirrors, and virtualizations: Frameworks for model verification and validation." *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering* 6.3 (2020): 030902.
- Hua, Edward Y., Sanja Lazarova-Molnar, and Deena P. Francis. "Validation of Digital Twins: Challenges and Opportunities." *2022 Winter Simulation Conference (WSC)*. IEEE, 2022.
- Darvishi, Hossein, Domenico Ciuonzo, and Pierluigi Salvo Rossi. "Exploring a modular architecture for sensor validation in digital twins." *2022 IEEE Sensors*. IEEE, 2022.

4. Modeling Formalisms for Digital Twins (core topic)

References:

- Magargle, Ryan, et al. "A Simulation-Based Digital Twin for Model-Driven Health Monitoring and Predictive Maintenance of an Automotive Braking System." *Modelica*. 2017.
- Liu, Qing, et al. "A comparative study on digital twin models." *AIP Conference Proceedings*. Vol. 2073. No. 1. AIP Publishing, 2019.
- Li, Haobin, et al. "Three Carriages Driving the Development of Intelligent Digital Twins-Simulation Plus Optimization and Learning." *2021 Winter Simulation Conference (WSC)*. IEEE, 2021.

5. Digital Twins Data Requirements (core topic)

References:

- Durão, Luiz Fernando CS, et al. "Digital twin requirements in the context of industry 4.0." *Product Lifecycle Management to Support Industry 4.0: 15th IFIP WG 5.1 International Conference, PLM 2018, Turin, Italy, July 2-4, 2018, Proceedings 15*. Springer International Publishing, 2018.
- Qi, Qinglin, and Fei Tao. "Digital twin and big data towards smart manufacturing and industry 4.0: 360 degree comparison." *Ieee Access* 6 (2018): 3585-3593.

6. Digital Twins for Manufacturing Systems

References:

- Zhang, Chenyuan, et al. "A reconfigurable modeling approach for digital twin-based manufacturing system." *Procedia Cirp* 83 (2019): 118-125.
- Kritzinger, Werner, et al. "Digital Twin in manufacturing: A categorical literature review and classification." *Ifac-PapersOnline* 51.11 (2018): 1016-1022.
- Jaensch, Florian, et al. "Digital twins of manufacturing systems as a base for machine learning." *2018 25th International conference on mechatronics and machine vision in practice (M2VIP)*. IEEE, 2018.

7. Digital Twins for Energy Systems

References:

- Steindl, Gernot, et al. "Generic digital twin architecture for industrial energy systems." *Applied Sciences* 10.24 (2020): 8903.
- Granacher, Julia, et al. "Overcoming decision paralysis—A digital twin for decision making in energy system design." *Applied Energy* 306 (2022): 117954.
- Palensky, Peter, et al. "Digital twins and their use in future power systems." *Digital Twin* 1 (2022): 4.

8. Digital Twins in Healthcare

References:

- Alazab, Mamoun, et al. "Digital twins for healthcare 4.0-recent advances, architecture, and open challenges." *IEEE Consumer Electronics Magazine* (2022).
- Croatti, Angelo, et al. "On the integration of agents and digital twins in healthcare." *Journal of Medical Systems* 44 (2020): 1-8.
- Erol, Tolga, Arif Furkan Mendi, and Dilara Doğan. "The digital twin revolution in healthcare." *2020 4th international symposium on multidisciplinary studies and innovative technologies (ISMSIT)*. IEEE, 2020.

9. Digital Twins of City Infrastructures (in Smart Cities)

References:

- Deren, Li, Yu Wenbo, and Shao Zhenfeng. "Smart city based on digital twins." *Computational Urban Science* 1 (2021): 1-11.
- Deng, Tianhu, Keren Zhang, and Zuo-Jun Max Shen. "A systematic review of a digital twin city: A new pattern of urban governance toward smart cities." *Journal of Management Science and Engineering* 6.2 (2021): 125-134.
- Mylonas, Georgios, et al. "Digital twins from smart manufacturing to smart cities: A survey." *Ieee Access* 9 (2021): 143222-143249.

10. Digital Twins in Logistics

References:

- Moshood, Taofeeq D., et al. "Digital twins driven supply chain visibility within logistics: A new paradigm for future logistics." *Applied System Innovation* 4.2 (2021): 29.
- Agalianos, K., et al. "Discrete event simulation and digital twins: review and challenges for logistics." *Procedia Manufacturing* 51 (2020): 1636-1641.
- Korth, Benjamin, Christian Schwede, and Markus Zajac. "Simulation-ready digital twin for realtime management of logistics systems." *2018 IEEE international conference on big data (big data)*. IEEE, 2018.

11. Cognitive Digital Twins

References:

- Al Faruque, Mohammad Abdullah, et al. "Cognitive digital twin for manufacturing systems." *2021 Design, Automation & Test in Europe Conference & Exhibition (DATE)*. IEEE, 2021.

- Zhang, Nan, Rami Bahsoon, and Georgios Theodoropoulos. "Towards engineering cognitive digital twins with self-awareness." *2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE, 2020.
- Zheng, Xiaochen, Jinzhi Lu, and Dimitris Kiritsis. "The emergence of cognitive digital twin: vision, challenges and opportunities." *International Journal of Production Research* 60.24 (2022): 7610-7632.

12. Fusing Data and Human Expert Knowledge in Digital Twins

References:

- Kulkarni, Vinay, Souvik Barat, and Tony Clark. "Towards adaptive enterprises using digital twins." *2019 winter simulation conference (WSC)*. IEEE, 2019.
- Vogel-Heuser, Birgit, et al. "Potential for combining semantics and data analysis in the context of digital twins." *Philosophical Transactions of the Royal Society A* 379.2207 (2021): 20200368.
- Todorovski, Ljupčo, and Sašo Džeroski. "Integrating knowledge-driven and data-driven approaches to modeling." *ecological modelling* 194.1-3 (2006): 3-13.

V Seminar Knowledge Discovery and Data Mining (Master)

2513309, SS 2024, 3 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this seminar different machine learning and data mining methods are implemented.

The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market
- Scientific Publications

Further Information: https://aifb.kit.edu/web/Lehre/Praktikum_Knowledge_Discovery_and_Data_Science

The exact dates and information for registration will be announced at the event page.

Organizational issues
Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu/.

Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

Literature
Detaillierte Referenzen werden zusammen mit den jeweiligenThemen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B.aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Seminar Data Science & Real-time Big Data Analytics (Master)

2513311, SS 2024, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues
Questions are answered via the e-mail address sem-ep@fzi.de.

V Cognitive Automobiles and Robots

2513500, SS 2024, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:

Attendance of the lecture machine learning

Workload:

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

V Seminar E-Voting (Master)

2513553, SS 2024, 2 SWS, Language: German/English, Open in study portal

Seminar (S)
On-Site

Content
What should a voting procedure fulfill? When is a voting procedure secure? Which components need to be examined? Which methods can be used to investigate this?

Cryptographic voting procedures and algorithmic voting (counting) procedures are examined from different perspectives (cryptographic methods, formal correctness, human factors).

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website (https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

Organizational issues
Die Anmeldung für das Seminar ist bis zum 17.04. über https://portal.wiwi.kit.edu/ys/8037 möglich.

T 7.400 Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
WT 23/24	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
WT 23/24	2550462	Seminar on Trending Topics in Optimization and Machine Learning (Master)	2 SWS	Seminar / 🧩	Rebennack, Warwicker
WT 23/24	2550473	Seminar on Energy and Power Systems Optimization (Master)	2 SWS	Seminar / 🧩	Rebennack, Warwicker
WT 23/24	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter
ST 2024	2500028	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter
ST 2024	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
ST 2024	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
Exams					
WT 23/24	7900011_WS2324	Seminar in Operations Research B (Bachelor)			Stein
WT 23/24	7900012_WS2324	Seminar in Operations Research A (Master)			Stein
WT 23/24	7900169	Seminar Trending Topics in Optimization and Machine Learning (Master)			Rebennack
WT 23/24	7900314	Seminar on Power Systems Optimization (Master)			Rebennack
WT 23/24	7900342	Seminar Modern OR and Innovative Logistics			Nickel
ST 2024	7900026	Seminar Modern OR and Innovative Logistics			Nickel
ST 2024	7900200_SS2024	Seminar in Operations Research A (Master)			Stein
ST 2024	7900201_SS2024	Seminar in Operations Research (Bachelor)			Stein

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Seminar on Methodical Foundations of Operations Research (B)**
2550131, WS 23/24, 2 SWS, Language: German, Open in study portal
Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V **Seminar: Modern OR and Innovative Logistics**
2550491, WS 23/24, 2 SWS, Language: German, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
Anmeldezeitraum: 11.09.23 bis 30.09.23 im Wiwi Portal

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V

Seminar: Modern OR and Innovative Logistics

2500028, SS 2024, 2 SWS, Language: German, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
Anmeldung erfolgt über das Wiwi-Portal. Nähere Informationen hierzu finden Sie hier zu einem späteren Zeitpunkt.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V

Seminar on Methodical Foundations of Operations Research (B)

2550131, SS 2024, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

T 7.401 Course: Seminar in Operations Research B (Master) [T-WIWI-103482]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
WT 23/24	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
WT 23/24	2550462	Seminar on Trending Topics in Optimization and Machine Learning (Master)	2 SWS	Seminar / 🧩	Rebennack, Warwicker
WT 23/24	2550473	Seminar on Energy and Power Systems Optimization (Master)	2 SWS	Seminar / 🧩	Rebennack, Warwicker
WT 23/24	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter
ST 2024	2500028	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar / 🧩	Nickel, Mitarbeiter
ST 2024	2550131	Seminar on Methodical Foundations of Operations Research (B)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
ST 2024	2550132	Seminar on Mathematical Optimization (MA)	2 SWS	Seminar / 🗣	Stein, Beck, Schwarze
Exams					
WT 23/24	7900011_WS2324	Seminar in Operations Research B (Bachelor)			Stein
WT 23/24	7900012_WS2324	Seminar in Operations Research A (Master)			Stein
WT 23/24	7900314	Seminar on Power Systems Optimization (Master)			Rebennack
WT 23/24	7900342	Seminar Modern OR and Innovative Logistics			Nickel
ST 2024	7900026	Seminar Modern OR and Innovative Logistics			Nickel
ST 2024	7900200_SS2024	Seminar in Operations Research A (Master)			Stein
ST 2024	7900201_SS2024	Seminar in Operations Research (Bachelor)			Stein

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Seminar on Methodical Foundations of Operations Research (B)**
2550131, WS 23/24, 2 SWS, Language: German, Open in study portal
Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V **Seminar: Modern OR and Innovative Logistics**
2550491, WS 23/24, 2 SWS, Language: German, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
Anmeldezeitraum: 11.09.23 bis 30.09.23 im Wiwi Portal

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V **Seminar: Modern OR and Innovative Logistics**
2500028, SS 2024, 2 SWS, Language: German, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
Anmeldung erfolgt über das Wiwi-Portal. Nähere Informationen hierzu finden Sie hier zu einem späteren Zeitpunkt.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V

Seminar on Methodical Foundations of Operations Research (B)

2550131, SS 2024, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

T 7.402 Course: Seminar in Statistics A (Master) [T-WIWI-103483]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2500012		2 SWS	Seminar / 🗣	Grothe, Kaplan, Liu
WT 23/24	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter
ST 2024	2500004	Predictive Data Analytics - An Introduction to Statistical Machine Learning	2 SWS	Seminar / 🗣	Schienle, Lerch
ST 2024	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Buse, Rüter, Bracher
ST 2024	2550561	Fortgeschrittene Themen zu Statistik, Datenanalyse und maschinellem Lernen (Master)	2 SWS	Seminar / 🗣	Grothe, Kaplan, Rieger, Liu
Exams					
WT 23/24	7900216	Seminar in Statistics A (Master)			Grothe
WT 23/24	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)			Schienle

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Topics in Econometrics

2521310, WS 23/24, 2 SWS, Language: German, Open in study portal

Seminar (S)

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V **Predictive Data Analytics - An Introduction to Statistical Machine Learning** **Seminar (S) On-Site**
2500004, SS 2024, 2 SWS, Language: German/English, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V **Advanced Topics in Econometrics** **Seminar (S)**
2521310, SS 2024, 2 SWS, Language: German/English, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

T 7.403 Course: Seminar in Statistics B (Master) [T-WIWI-103484]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2500012		2 SWS	Seminar / 🗣	Grothe, Kaplan, Liu
WT 23/24	2521310	Topics in Econometrics	2 SWS	Seminar	Schienle, Rüter
ST 2024	2500004	Predictive Data Analytics - An Introduction to Statistical Machine Learning	2 SWS	Seminar / 🗣	Schienle, Lerch
ST 2024	2521310	Advanced Topics in Econometrics	2 SWS	Seminar	Schienle, Krüger, Buse, Rüter, Bracher
ST 2024	2550561	Fortgeschrittene Themen zu Statistik, Datenanalyse und maschinellem Lernen (Master)	2 SWS	Seminar / 🗣	Grothe, Kaplan, Rieger, Liu
Exams					
WT 23/24	7900241	Seminar in Statistics B (Master)			Grothe
WT 23/24	7900254	Topics in Econometrics. Seminar in Economics (Bachelor)			Schienle

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Topics in Econometrics

2521310, WS 23/24, 2 SWS, Language: German, Open in study portal

Seminar (S)

Organizational issues
Blockveranstaltung, Termine werden auf Homepage und über Ilias bekannt gegeben

V **Predictive Data Analytics - An Introduction to Statistical Machine Learning** **Seminar (S) On-Site**
2500004, SS 2024, 2 SWS, Language: German/English, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

V **Advanced Topics in Econometrics** **Seminar (S)**
2521310, SS 2024, 2 SWS, Language: German/English, Open in study portal

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

T 7.404 Course: Seminar in Transportation [T-BGU-100014]

Responsible: Dr.-Ing. Bastian Chlond
Prof. Dr.-Ing. Peter Vortisch

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	6232903	Seminar Verkehrswesen	2 SWS	Seminar /	Chlond, Vortisch, Kagerbauer
ST 2024	6232903	Seminar Verkehrswesen	2 SWS	Seminar /	Vortisch, Kagerbauer
Exams					
WT 23/24	8245100014	Seminar in Transportation			Vortisch, Chlond

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
seminar paper, appr. 10 pages, and presentation, appr. 10 min.

Prerequisites
The seminar is subject to approval. The approval must be applied for at the examination secretariat of the Department of Economics and Management. The application for admission is made via the corresponding engineering seminar form on the department's download page.

Recommendation
none

Annotation
none

T 7.405 Course: Seminar on Modeling and Simulation in Transportation [T-BGU-112552]

Responsible: PD Dr.-Ing. Martin Kagerbauer
Prof. Dr.-Ing. Peter Vortisch

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	3	Grade to a third	Each winter term	1 terms	1

Events					
WT 23/24	6232907	Seminar Modellierung und Simulation im Verkehrswesen	2 SWS	Seminar /	Vortisch, Kagerbauer, Mitarbeiter/innen
Exams					
WT 23/24	8245112552	Seminar on Modeling and Simulation in Transportation			Vortisch, Kagerbauer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
work on a practical problem in the area of traffic engineering, traffic simulation or in the area of microscopic travel demand modeling:

final report, appr. 5 pages, and presentation, appr. 10 min.

Prerequisites
The seminar is subject to approval if it is to be credited in the seminar module. The approval must be applied for at the examination secretariat of the Department of Economics and Management. The application for admission is made via the corresponding engineering seminar form on the department's download page.

Recommendation
none

Annotation
none

T 7.406 Course: Seminar Production Technology [T-MACH-109062]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Prof. Dr.-Ing. Gisela Lanza
Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
ST 2024	2149665	Seminar Production Technology	1 SWS	Seminar /	Fleischer, Lanza, Schulze, Zanger
Exams					
WT 23/24	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze
ST 2024	76-T-MACH-109062	Seminar Production Technology			Fleischer, Lanza, Schulze

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

Prerequisites
none

Annotation
The specific topics are published on the homepage of the wbk Institute of Production Science.

Below you will find excerpts from events related to this course:

V **Seminar Production Technology**
2149665, SS 2024, 1 SWS, Language: German, Open in study portal
Seminar (S)
Blended (On-Site/Online)

Content
In course of the seminar Production Technology current issues of the wbk main fields of research "Manufacturing and Materials Technology", "Machines, Equipment and Process Automation" as well as "Production Systems" are discussed.

The specific topics are published on the homepage of the wbk Institute of Production Science.

Learning Outcomes:

The students …

- are in a position to independently handle current, research-based tasks according to scientific criteria.
- are able to research, analyze, abstract and critically review the information.
- can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Workload:

regular attendance: 10 hours
self-study: 80 hours

Organizational issues
siehe http://www.wbk.kit.edu/seminare.php

T 7.407 Course: Seminar Sensors [T-ETIT-100707]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101158 - Sensor Technology I

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2304233	Seminar Sensor Technology	2 SWS	Seminar / 🗣	Menesklou
ST 2024	2304233	Seminar Sensorik	2 SWS	Seminar / 🗣	Menesklou
Exams					
WT 23/24	7304233	Seminar Sensors			Menesklou

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.408 Course: Seminar: Commercial and Corporate Law in the IT Industry [T-INFO-111405]

Responsible: Dr. Georg Nolte
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2400165	Seminar Commercial and Corporate Law in Information Technology	2 SWS	Seminar /	Nolte
Exams					
WT 23/24	7500182	Seminar: Legal Studies II			Boehm, Raabe, Sattler
WT 23/24	7500310	Seminar: Commercial and Corporate Law in the IT Industry			Sattler

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 7.409 Course: Seminar: IT- Security Law [T-INFO-111404]

Responsible: Martin Schallbruch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 23/24	24389	Seminar "IT-Sicherheitsrecht"	2 SWS	Seminar	Schallbruch
Exams					
WT 23/24	7500249	Seminar: IT- Security Law			Zufall

T 7.410 Course: Seminar: Legal Studies I [T-INFO-101997]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each term	1

Events					
WT 23/24	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / 🗣	Reussner, Raabe, Werner, Müller-Quade
WT 23/24	2400184	EU Digital Regulatory Framework	2 SWS	Seminar / 🗣	Zufall
WT 23/24	2400203	(Smart) City in and as a Network	2 SWS	Seminar / 🗣	Kasper
WT 23/24	2513214	Seminar Information security and Data protection (Bachelor)	2 SWS	Seminar / 🗣	Oberweis, Volkamer, Raabe, Schiefer, Hennig, Sterz, Veit, Ballreich, Mossano
ST 2024	2400005	Governance, Risk & Compliance	2 SWS	Seminar / 🗣	Herzig, Siddiq
ST 2024	2400078	Intelligente Chatbots und Recht	2 SWS	Seminar / 🗣	Raabe
ST 2024	2400194	(Generative) KI und Recht	2 SWS	Seminar / 🖧	Boehm, Vettermann
ST 2024	2400204	„Vom Original zur Kopie und vom Analogen zum Digitalen“	2 SWS	Seminar / 🗣	Dreier, Jehle
ST 2024	2400207	Rechtlicher Rahmen für die Europäische Datenökonomie	2 SWS	Seminar / 🗣	Sattler
ST 2024	2400208	Rechtlicher Rahmen für Künstliche Intelligenz	2 SWS	Seminar / 🗣	Sattler
ST 2024	24820	Current Issues in Patent Law	2 SWS	Seminar / 🗣	Melullis
Exams					
WT 23/24	7500035	Seminar: Legal Studies II			Zufall
WT 23/24	7500182	Seminar: Legal Studies II			Boehm, Raabe, Sattler
WT 23/24	7500232	Seminar Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection			Reussner
ST 2024	7500140	Seminar: Legal Studies I			Raabe, Melullis, Boehm, Matz
ST 2024	7500159	Seminar: Legal Studies I			Zufall

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V EU Digital Regulatory Framework

2400184, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This class aims to provide an overview on the legal instruments forming the EU digital regulatory framework. Following its Digital Single Market Strategy, the EU has set up a new strategic programme for a "Digital Decade". Existing regulations like the General Data Protection Regulation (GDPR), or the E-Commerce Directive, are being complemented by a variety of new instruments that aim to set binding rules on online markets, to regulate data flows in various ways, but also to pioneer a legal framework on AI. Prominent instruments include the new AI Act (proposal), the Digital Services Act (DSA) and Digital Markets Act (DMA), the Data Act, Data Governance Act, or Open Data Directive.

The class will provide an overview on the existing framework: Which regulations and directives are relevant? How do they apply and interact which each other in a broader context?

Another objective is to provide students with the ability to read these legal instruments: How to access regulatory instruments that often have more than 100 pages (without having to read every single sentence)? How to gain a comprehensive, high-level understanding of the instrument? How to identify parts relevant to a particular legal problem?

The class will start with an introduction into EU law and regulatory instruments in general. Concrete guidance on reading, analysing and working with legal instruments in English will be given. Based on these instructions, students will be assigned legal instruments to present in the final unit along with a two-pages report.

Grades will be assigned based on the quality of these presentations and the report, as well as participation in the discussion (presentation: 40 %, two-pages report: 40 %, discussion: 20 %).

Organizational issues
WS 2023/24

T 7.411 Course: Seminar: Legal Studies II [T-INFO-105945]

Responsible: N.N.
Organisation: KIT Department of Informatics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Version
Examination of another type	3	Grade to a third	1

Events					
WT 23/24	2400014	Current Issues in Patent Law	2 SWS	Seminar / 🗣	Melullis
WT 23/24	2400060	Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection	2 SWS	Seminar / 🗣	Reussner, Raabe, Werner, Müller-Quade
WT 23/24	2400125	Security and Privacy Awareness	2 SWS	Seminar / 🧩	Seidel-Saul, Volkamer, Boehm, Aldag, Veit
WT 23/24	2400184	EU Digital Regulatory Framework	2 SWS	Seminar / 🗣	Zufall
WT 23/24	2400203	(Smart) City in and as a Network	2 SWS	Seminar / 🗣	Kasper
WT 23/24	2400209	Immaterialgüterrechtliche Herausforderungen durch KI und das neue EU-Datengesetz	2 SWS	Seminar / 🗣	Sattler
WT 23/24	2513214	Seminar Information security and Data protection (Bachelor)	2 SWS	Seminar / 🗣	Oberweis, Volkamer, Raabe, Schiefer, Hennig, Sterz, Veit, Ballreich, Mossano
ST 2024	2400194	(Generative) KI und Recht	2 SWS	Seminar / 🧩	Boehm, Vettermann
ST 2024	2400204	„Vom Original zur Kopie und vom Analogen zum Digitalen“	2 SWS	Seminar / 🗣	Dreier, Jehle
ST 2024	2400207	Rechtlicher Rahmen für die Europäische Datenökonomie	2 SWS	Seminar / 🗣	Sattler
ST 2024	2400208	Rechtlicher Rahmen für Künstliche Intelligenz	2 SWS	Seminar / 🗣	Sattler
Exams					
WT 23/24	7500035	Seminar: Legal Studies II			Zufall
WT 23/24	7500182	Seminar: Legal Studies II			Boehm, Raabe, Sattler
WT 23/24	7500232	Seminar Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection			Reussner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Below you will find excerpts from events related to this course:

V Security and Privacy Awareness

2400125, WS 23/24, 2 SWS, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Note: The link to enrol is for every student, regardless of the study background!

Dates:

- Kick-Off : 23.10.23 14:00 o'clock, Room 1C-03, building 5.20
- First version: 07.01.24
- Final version: 17.02.24
- Presentation: CW 12

Topics will be assigned after the kick-off.

Consider that legal-focused topics require you to speak and understand German legal texts.

Topics:

1: Literature review on reporting obligations / information security incidents (literature - seminar

2: Privacy Awareness with electronic patient file

4: Ethical analysis of so-called attacker studies that gather security awareness data in public space.

5: Collecting data: The boundaries of consent

Further Topics TBA!

ATTENTION: The seminar is only for MASTER students!

V

EU Digital Regulatory Framework

2400184, WS 23/24, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
This class aims to provide an overview on the legal instruments forming the EU digital regulatory framework. Following its Digital Single Market Strategy, the EU has set up a new strategic programme for a "Digital Decade". Existing regulations like the General Data Protection Regulation (GDPR), or the E-Commerce Directive, are being complemented by a variety of new instruments that aim to set binding rules on online markets, to regulate data flows in various ways, but also to pioneer a legal framework on AI. Prominent instruments include the new AI Act (proposal), the Digital Services Act (DSA) and Digital Markets Act (DMA), the Data Act, Data Governance Act, or Open Data Directive.

The class will provide an overview on the existing framework: Which regulations and directives are relevant? How do they apply and interact which each other in a broader context?

Another objective is to provide students with the ability to read these legal instruments: How to access regulatory instruments that often have more than 100 pages (without having to read every single sentence)? How to gain a comprehensive, high-level understanding of the instrument? How to identify parts relevant to a particular legal problem?

The class will start with an introduction into EU law and regulatory instruments in general. Concrete guidance on reading, analysing and working with legal instruments in English will be given. Based on these instructions, students will be assigned legal instruments to present in the final unit along with a two-pages report.

Grades will be assigned based on the quality of these presentations and the report, as well as participation in the discussion (presentation: 40 %, two-pages report: 40 %, discussion: 20 %).

Organizational issues
WS 2023/24

T 7.412 Course: Sensors [T-ETIT-101911]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101158 - Sensor Technology I

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	2304231	Sensors	2 SWS	Lecture / 🗣	Menesklou
Exams					
WT 23/24	7304231	Sensors			Menesklou
ST 2024	7304231	Sensors			Menesklou

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.413 Course: Service Design Thinking [T-WIWI-102849]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101503 - Service Design Thinking

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	12	Grade to a third	Irregular	4

Events					
WT 23/24	2595600	Service Design Thinking	2 SWS	Lecture / 🗣	Satzger, Feldmann
ST 2024	2595600	Service Design Thinking	2 SWS	Lecture / 🗣	Feldmann, Terzidis, Satzger
Exams					
ST 2024	7900307	Service Design Thinking			Satzger
ST 2024	7900312	Practical Seminar Service Innovation			Satzger

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is assessed in the form of an alternative exam assessment which consists of a case study, workshops, and a final presentation. The weighting of these components for the grade will be announced at the beginning of the course.

Prerequisites
None

Recommendation
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

Annotation
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.

Below you will find excerpts from events related to this course:

V Service Design Thinking

2595600, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The Service Design Thinking course is more than a usual lecture. You will learn what it really takes to be an innovator. You will receive education in the human-centric innovation approach Design Thinking, work in small but interdisciplinary and international teams on real business challenges over the course of nine months (September to June). You will collaborate directly with mentors from a partner company as well as with fellow students from renowned universities from the SUGAR network, e.g. the University of St. Gallen, the Trinity College Dublin or the University of Science and Technology of China (USTC). Along the way, you will visit international destinations known for being innovation hotspots and will be on stage at innovation events that draw an audience of several hundred participants.

What students will learn:

- Deep knowledge of the innovation method "Design Thinking", as introduced and promoted by Stanford University.
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users.
- Know-how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution.
- Learn to apply the method to real innovation projects issued by industry partners.
- Communicate, work and present in an interdisciplinary and international project setting.

Course phases (roughly 4 weeks each):

- **Paper Bike**:
  Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (internally known as Design Thinking network).
- **Design Space Exploration**:
  Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype:
  Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- **Dark Horse Prototype**:
  Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are the focus of this phase.
- **Funky Prototype**:
  Integration of the individually tested and successful functions to a complete solution, which is further tested and developed.
- **Functional Prototype**:
  Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is laid out in detail and tested with users.
- **Final Prototype**:
  Implementing the functional prototype and presenting it to the customer as well as the SUGAR network.

Organizational issues
Bei der Vorlesung handelt es sich um eine zweisemestrige Veranstaltung, die jährlich im September startet.

Literature

- Design Thinking: Das Handbuch; Falk Uebernickel, Walter Brenner, Therese Naef, Britta Pukall, Bernhard Schindlholzer
- The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems; Michael Lewrick, Patrick Link, Larry Leifer
- The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods; Michael Lewrick, Patrick Link, Larry Leifer
- Frame Innovation: Create New Thinking by Design (Design Thinking, Design Theory); Kees Dorst

V **Service Design Thinking** — **Lecture (V)** **On-Site**
2595600, SS 2024, 2 SWS, Language: English, Open in study portal

Content
The Service Design Thinking program is much more than a normal course. Through this program, we provide the knowledge and skills that true innovators need. In this context, we train our participants in the human-centric innovation approach “Design Thinking”. In addition, participants work in small international and interdisciplinary teams on real innovation challenges from practice.

The teams are made up of students from KIT and another university from the global SUGAR network. These include, for example, the Hasso Plattner Institute in Potsdam, Trinity College in Dublin and the University of Science and Technology of China. The program includes visits to international events of the SUGAR Network, which are usually held in places known for their high level of innovation. At these events, our participants present their (interim) results to a large audience consisting of employees from the partner companies and the universities involved.

What students will learn:

- A comprehensive understanding of the globally recognized innovation approach “Design Thinking” as introduced and promoted by the Stanford University
- Development of new, creative solutions through extensive need finding, in particular with regard to the relevant service users
- to develop prototypes of the collected ideas early and independently, to test them and improve them iteratively, thereby solving the issue defined by the partner company
- to communicate, present and network in an interdisciplinary and international environment
- to apply the learned approach in the context of a real innovation project provided by a practical partner.

Course phases (roughly 4 weeks each):

- **Kick off:**
  Learning the basic method elements by solving an exercise challenge. Participation in the Global Kick-Off of the SUGAR Network consisting of method workshops, working on team challenges, networking with other universities and forming project teams for the challenges of the practical partners.
- **Design Space Exploration**:
  Exploring the problem space by questioning the given innovation challenge from practice. Familiarization with the topic area of the respective challenge. Gathering first impressions of the requirements and needs of people related to the problem.
- **Critical Function Prototype:**
  Building an intensive understanding of the needs of the target group of the respective challenge. Deriving critical functions from the customer's perspective that could help solve the overall problem. Building prototypes for the critical functions and testing them in real customer situations.
- **Dark Horse Prototype**:
  Reversal of assumptions and experiences made so far. The goal is to develop radically new and unconventional ideas. Implementation of the ideas into simple prototypes and subsequent testing.
- **Funky Prototype**:
  Integration of the individual successfully tested functions from the critical function and dark horse phase into solution concepts. These are also tested and further developed.
- **Functional Prototype**:
  Selection of successful funky prototypes and development of these towards high-resolution prototypes. The final solution approach for the project is written down in detail and feedback is obtained.
- **Final Prototype**:
  Implementing the final prototype and presenting it to the practical partner as well as the SUGAR Network.

Organizational issues
Bei der Vorlesung handelt es sich um eine zweisemestrige Veranstaltung, die jährlich im September startet.

Literature

- Design Thinking: Das Handbuch; Falk Uebernickel, Walter Brenner, Therese Naef, Britta Pukall, Bernhard Schindlholzer
- The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems; Michael Lewrick, Patrick Link, Larry Leifer
- The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods; Michael Lewrick, Patrick Link, Larry Leifer
- Frame Innovation: Create New Thinking by Design (Design Thinking, Design Theory); Kees Dorst

T 7.414 Course: SIL Entrepreneurship Emphasis [T-WIWI-110287]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2500002	SIL Entrepreneurship Emphasis	2-4 SWS	Seminar	Terzidis
Exams					
WT 23/24	7900041	SIL Entrepreneurship Emphasis			Terzidis

Competence Certificate
Alternative exam assessment (§4(2), 3 SPO). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar. In addition, smaller, ungraded tasks are provided in the course to monitor progress.

Prerequisites
None

Recommendation
None

T 7.415 Course: SIL Entrepreneurship Project [T-WIWI-110166]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105010 - Student Innovation Lab (SIL) 1

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2545082	SIL Entrepreneurship Project	2-4 SWS	Seminar	Terzidis
Exams					
WT 23/24	7900037	SIL Entrepreneurship Project			Terzidis

Competence Certificate
Alternative exam assessment (§4(2), 3 SPO). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar. In addition, smaller, ungraded tasks are provided in the course to monitor progress.

Prerequisites
None

Recommendation
None

T 7.416 Course: Simulation Game in Energy Economics [T-WIWI-108016]

Responsible: Dr. Massimo Genoese
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3,5	Grade to a third	Each summer term	2

Events					
ST 2024	2581025	Simulation Game in Energy Economics	3 SWS	Lecture / Practice (/	Genoese, Zimmermann
Exams					
ST 2024	7981025	Simulation Game in Energy Economics			Fichtner

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Prerequisites
None

Recommendation
Visiting the course "Introduction to Energy Economics"

Annotation
The number of participants is limited.
There is a registration procedure via CAS followed by a selection of the participants.

Below you will find excerpts from events related to this course:

V Simulation Game in Energy Economics

2581025, SS 2024, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

Assessment: presentation and written summary

Prerequisites: Basics in Energy economics ad markets are advantageous.

Organizational issues
CIP-Pool West, Raum 102, Geb. 06.41 - siehe Institutsaushang

Literature
Weiterführende Literatur:

Möst, D. und Genoese, M. (2009): Market power in the German wholesale electricity market. The Journal of Energy Markets (47–74). Volume 2/Number 2, Summer 2009

T 7.417 Course: Simulation of Coupled Systems [T-MACH-105172]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	2

Events					
ST 2024	2114095	Simulation of Coupled Systems	2 SWS	Lecture / 🗣	Geimer, Breitfuß
Exams					
WT 23/24	76T-MACH-105172	Simulation of Coupled Systems			Geimer

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at very ordinary examination date.

A registration in mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines*. In case of too many applications, attendance will be granted based on pre-qualification.

Prerequisites
Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108888 must have been passed.

Recommendation

- Knowledge of ProE (ideally in actual version)
- Basic kniwledge of Matlab/Simulink
- Basic knowledge of dynamics of machnies
- Basic knowledge of hydraulics

Annotation
After completion of course, students are able to:

- build a coupled simulation
- parametrize models
- perform simulations
- conduct troubleshooting
- check results for plausibility

The number of participants is limited.

Content:

- Basics of multi-body and hydralics simulation programs
- Possibilities of coupled simulations
- Modelling and Simulation of Mobile Machines using a wheel loader
- Documentation of the result in a short report

Literature:

Software guide books (PDFs)

Information about wheel-type loader specifications

Below you will find excerpts from events related to this course:

V

Simulation of Coupled Systems

2114095, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

- Knowledge of the basics of multi-body and hydraulic simulation programs
- Possibilities of coupled simulations
- Development of a simulation model by using the example of a wheel loader
- Documentation of the result in a short report

It is recommended to have:

- Knowledge of ProE (ideally in current version)
- Basic knowledge of Matlab/Simulink
- Basic knowledge of dynamics of machines
- Basic knowledge of hydraulics

- regular attendance: 21 hours
- total self-study: 92 hours

Literature
Weiterführende Literatur:

- Diverse Handbücher zu den Softwaretools in PDF-Form
- Informationen zum verwendeten Radlader

T 7.418 Course: Simulation of Coupled Systems - Advance [T-MACH-108888]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Yusheng Xiang

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Exams			
WT 23/24	76-T-MACH-108888	Simulation of Coupled Systems - Advance	Geimer

Competence Certificate
Preparation of semester report

Prerequisites
none

T 7.419 Course: Simulation of Nanoscale Systems, without Seminar [T-PHYS-102504]

Responsible: Prof. Dr. Wolfgang Wenzel
Organisation: KIT Department of Physics
Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Irregular	1

Prerequisites
none

T 7.420 Course: Site Management [T-BGU-103427]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	1,5	Grade to a third	Each summer term	1

Events					
ST 2024	6241801	Site Management	1 SWS	Lecture / Practice (/ 🗣	N.N.
Exams					
WT 23/24	8240103427	Site Management			Haghsheno

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.421 Course: Smart Energy Infrastructure [T-WIWI-107464]

Responsible: Dr. Armin Ardone
Dr. Dr. Andrej Marko Pustisek
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Grading scale	Recurrence	Version
Written examination	5,5	Grade to a third	Each winter term	2

Events					
WT 23/24	2581023	(Smart) Energy Infrastructure	4 SWS	Lecture / 🗣	Ardone, Pustisek
Exams					
WT 23/24	7900178	Smart Energy Infrastructure NEW			Fichtner
WT 23/24	7981023	Smart Energy Infrastructure			Fichtner
ST 2024	7900228	Smart Energy Infrastructure NEW			Fichtner
ST 2024	7981023	Smart Energy Infrastructure			Fichtner

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 minutes). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Below you will find excerpts from events related to this course:

V (Smart) Energy Infrastructure

2581023, WS 23/24, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The lecture provides a techno-economic overview of different infrastructures of the energy system and their importance regarding the future energy system (“Energiewende”) – in particular

- for electricity:
  - the supply side (e.g. power plants)
  - the demand side (e.g. load structures of appliances, flexibilities) as well as
  - transport infrastructures (electricity grids)
- for fuel transportation:
  - pipeline infrastructures (focus on natural gas)
  - shipping of LNG
  - crude oil and oil product transportation
  - hydrogen transportation
  - comparison of potential energy carriers for global trade of renewable energy (e.g., hydrogen and its derivates, e-fuels, reactive metals)
- storage systems (e.g. batteries)

Additionally, the lecture provides a toolbox for energy system analysis such as an overview and classification of energy systems modelling approaches as well as the usage of scenario techniques for energy systems analysis.

The lecture also provides practical examples for the relevant methods presented.

Organizational issues
Blockveranstaltung
16.11., 17.11., 30.11., 01.12., 07.12., 08.12., 14.12., 15.12.

T 7.422 Course: Smart Grid Applications [T-WIWI-107504]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	see Annotations	2

Events					
WT 23/24	2540453	Übung zu Smart Grid Applications	1 SWS	Lecture / 🗣	Henni
Exams					
WT 23/24	7900235	Smart Grid Applications			Weinhardt
ST 2024	7900308	Smart Grid Applications			Weinhardt

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendation
None

Annotation
The lecture will no longer be offered from the coming winter semester 2023/24. It is only possible to take part in the main exam (first-time writer) and follow-up exam (repeater).

T 7.423 Course: Social Choice Theory [T-WIWI-102859]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-101504 - Collective Decision Making

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2520537	Social Choice Theory	2 SWS	Lecture / 🗣	Puppe
ST 2024	2520539	Übung zu Social Choice Theory	1 SWS	Practice / 🗣	Puppe, Kretz

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Success is assessed by an alternative exam assessment in the form of an open-book examination lasting 60 minutes. The examination is offered every summer semester.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Social Choice Theory

2520537, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
How should (political) candidates be elected? What are good ways of merging individual judgments into collective judgments? Social Choice Theory is the systematic study and comparison of how groups and societies can come to collective decisions.

The course offers a rigorous and comprehensive treatment of judgment and preference aggregation as well as voting theory. It is divided into two parts. The first part deals with (general binary) aggregation theory and builds towards a general impossibility result that has the famous Arrow theorem as a corollary. The second part treats voting theory. Among other things, it includes prooving the Gibbard-Satterthwaite theorem.

Literature
Main texts:

- Hervé Moulin: Axioms of Cooperative Decision Making, Cambridge University Press, 1988
- Christian List and Clemens Puppe: Judgement Aggregation. A survey, in: Handbook of rational & social choice, P.Anand,P.Pattanaik, C.Puppe (Eds.), Oxford University Press 2009.

Secondary texts:

- Amartya Sen: Collective Choice and Social Welfare, Holden-Day, 1970
- Wulf Gaertner: A Primer in Social Choice Theory, revised edition, Oxford University Press, 2009
- Wulf Gaertner: Domain Conditions in Social Choice Theory, Oxford University Press, 2001

T 7.424 Course: Sociotechnical Information Systems Development [T-WIWI-109249]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Events					
ST 2024	2512400	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)	3 SWS	Practical course /	Sunyaev, Leiser
ST 2024	2512401	Advanced Lab Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course /	Sunyaev, Leiser
Exams					
WT 23/24	7900080	Advanced Lab Development of Sociotechnical Information Systems (Bachelor)			Sunyaev
WT 23/24	7900143	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev
ST 2024	7900173	Advanced Lab Development of Sociotechnical Information Systems (Master)			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
The alternative exam assessment consists of an implementation and a final thesis documenting the development and use of the application.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V **Advanced Lab Development of Sociotechnical Information Systems (Bachelor)**
2512400, SS 2024, 3 SWS, Language: German/English, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

V **Advanced Lab Development of Sociotechnical Information Systems (Master)**
2512401, SS 2024, 3 SWS, Language: German/English, Open in study portal
Practical course (P)
Blended (On-Site/Online)

Content
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

T 7.425 Course: Software Quality Management [T-WIWI-102895]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	2

Events					
ST 2024	2511208	Software Quality Management	2 SWS	Lecture / 🗣	Alpers
ST 2024	2511209	Übungen zu Software-Qualitätsmanagement	1 SWS	Practice / 🗣	Frister, Forell
Exams					
WT 23/24	79AIFB_STQM_C1	Software Quality Management			Oberweis
ST 2024	79AIFB_STQM_A5	Software Quality Management (Registration until 15 July 2024)			Oberweis

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Software Quality Management

2511208, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

Learning objectives:

Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of sofware certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

Recommendations:

Programming knowledge in Java and basic knowledge of computer science are expected.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 2008
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Weitere Literatur wird in der Vorlesung bekanntgegeben.

T 7.426 Course: Spatial Economics [T-WIWI-103107]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101485 - Transport Infrastructure Policy and Regional Development
M-WIWI-101496 - Growth and Agglomeration
M-WIWI-101497 - Agglomeration and Innovation

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2561260	Spatial Economics	2 SWS	Lecture / 🗣	Ott
WT 23/24	2561261	Exercise for Spatial Economics	1 SWS	Practice / 🗣	Ott, Mirzoyan
Exams					
WT 23/24	7900075	Spatial Economics			Ott
WT 23/24	7900276	Spatial Economics			Ott

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as an open-book examination, or as a 60-minute written examination.

Prerequisites
None

Recommendation
Basic micro- and macroeconomic knowledge is required, such as that taught in the courses "Economics I" [2600012] and "Economics II" [2600014], attendance of which is strongly recommended (but not mandatory). An interest in quantitative-mathematical modeling is also a prerequisite. Attendance of the course "Introduction to Economic Policy" [2560280] is recommended.

Below you will find excerpts from events related to this course:

V Spatial Economics

2561260, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course covers the following topics:

- Geography, trade and development
- Geography and economic theory
- Core models of economic geography and empirical evidence
- Agglomeration, home market effect, and spatial wages
- Applications and extensions

Learning objectives:

The student

- analyses how spatial distribution of economic activity is determined.
- uses quantitative methods within the context of economic models.
- has basic knowledge of formal-analytic methods.
- understands the link between economic theory and its empirical applications.
- understands to what extent concentration processes result from agglomeration and dispersion forces.
- is able to determine theory based policy recommendations.

Recommendations:

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. An interest in mathematical modeling is advantageous.

Workload:

The total workload for this course is approximately 135 hours.

- Classes: ca. 30 h
- Self-study: ca. 45 h
- Exam and exam preparation: ca. 60 h

Assessment:

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Literature
Steven Brakman, Harry Garretsen, Charles van Marrewijk (2009): The New Introduction to Geographical Economics, 2nd ed, Cambridge University Press.

Weitere Literatur wird in der Vorlesung bekanntgegeben.
(Further literature will be announced in the lecture.)

T 7.427 Course: Special Topics in Highway Engineering and Environmental Impact Assessment [T-BGU-101860]

Responsible: Dr.-Ing. Matthias Zimmermann
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-100999 - Highway Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6233804	Environmental Sustainability of Roads	1 SWS	Lecture / 🗣	Zimmermann
ST 2024	6233807	Special Chapters in Road Systems	1 SWS	Lecture / 🗣	Zimmermann

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam with 15 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.428 Course: Special Topics in Information Systems [T-WIWI-109940]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101411 - Information Engineering
M-WIWI-101506 - Service Analytics
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each term	2

Exams			
WT 23/24	7900263	Special Topics in Information Systems	Weinhardt

Competence Certificate
The assessment of this course is in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class.
Please take into account that, beside the written documentation, also a practical component (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The overall grade is composed as follows:

A total of 60 points can be achieved, of which

- A maximum of 30 points for the written documentation
- A maximum of 30 points for the practical component

In order to pass the success control, at least 15 points (written documentation / practical component) must be achieved.

Prerequisites
see below

Recommendation
None

Annotation
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre.

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in “Information Systems” so far. With this course students majoring in “Industrial Engineering and Management“ and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.

T 7.429 Course: Startup Experience [T-WIWI-111561]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each term	1

Events					
WT 23/24	2545004	Startup Experience	4 SWS	Seminar / 🗣	Weimar, Martjan, Terzidis
ST 2024	2545004	Startup Experience	4 SWS	Seminar / 🗣	Weimar, Terzidis, Martjan, Rosales Bravo
Exams					
WT 23/24	7900186	Startup Experience			Terzidis
ST 2024	7900186	Startup Experience			Terzidis

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Alternative exam assessment. Details on the design of the examination performance of other types will be announced in the course.The grade is composed of a presentation and a written paper (plus any specified documentation, e.g. work results, experience diary, reflection).

Recommendation
Lecture Entrepreneurship already completed

Annotation
The language in the seminar is English. The seminar contents will be published on the chair homepage.

Below you will find excerpts from events related to this course:

V **Startup Experience** — **Seminar (S) On-Site**
2545004, WS 23/24, 4 SWS, Language: English, Open in study portal

Content
Content

In the Startup Experience seminar you will develop entrepreneurial competences that will enable you to build a new business. In an entrepreneurial project, you have three main objectives:

1. Identify and develop an opportunity. Who is your target customer and what problem or task does he or she have? How attractive and how big is this market?
2. How will you add value to it? How can you use specific resources, including technology, to develop a solution?
3. How can you design and set up a viable organisation? What business model do you propose to create, deliver and capture value?

Our primary focus is on digital healthcare ventures, granting you the opportunity to delve into the realm of entrepreneurship within the healthcare system. After gaining a deep understanding of healthcare needs, you will utilize creativity techniques to uncover potential business ideas that provide value for patients and doctors. Additionally, you will learn how to create viable business models, dive into health regulations, and pitch your idea to a jury.

Learning Objectives

After completing this course, the course participants will be able to:

- Work effectively in a cohesive team
- Understand the role of digital entrepreneurship in healthcare
- Apply creativity techniques to ideate
- Use utility analysis approaches to select promising solutions
- Develop a value proposition based on techniques like the value proposition canvas or the jobs-to-be-done method
- Apply advanced business modeling methods to develop a sound business concept
- Develop and deliver a concise presentation (“pitch”) to communicate your project
- Gain basic knowledge of healthcare regulations and reimbursement ways

Additional information:

Alternative exam assessment. The grade consists of the presentation and the written elaboration. Potentially, a ‘project diary’ of the seminar progress may be part of the deliverables (depends on tutor and will be communicated at the kick-off).

For a successful course completion, we expect you to submit a Business Plan with the following features:

- Scope: 9000 words,
- Sound and clear structure,
- Expression and spelling are correct
- Complete and correct references, quotations, etc.
- Visual elements are chosen appropriately
- Documentation and traceability of data acquisition, analysis and evaluation,
- Content is developed according to the course instructions.

Furthermore, we expect you to deliver a team Pitch.

- Duration: will be communicated (typically 5-10 minutes)
- Content: Introduction/Purpose; Problem; Solution; Business Model; Prototype; Competition; Management Team; Current Status and next steps,
- Layout and form: appropriate choice,
- Appearance: appropriate amount of visual elements,
- Data: well researched and organized visually
- Story Line: is sound; clear and convincing.

Organizational issues
Registration is via the Wiwi portal.

In the seminar you will work on a project in teams of max. 5 persons. The groups are formed in the seminar.

V **Startup Experience** **Seminar (S)**
2545004, SS 2024, 4 SWS, Language: English, Open in study portal **On-Site**

Content
Content

In the Startup Experience seminar you will develop entrepreneurial competences that will enable you to build a new business. In an entrepreneurial project, you have three main objectives:

1. Identify and develop an opportunity. Who is your target customer and what problem or task does he or she have? How attractive and how big is this market?
2. How will you add value to it? How can you use specific resources, including technology, to develop a solution?
3. How can you design and set up a viable organisation? What business model do you propose to create, deliver and capture value?

Our primary focus is on digital healthcare ventures, granting you the opportunity to delve into the realm of entrepreneurship within the healthcare system. After gaining a deep understanding of healthcare needs, you will utilize creativity techniques to uncover potential business ideas that provide value for patients and doctors. Additionally, you will learn how to create viable business models, dive into health regulations, and pitch your idea to a jury.

Learning Objectives

After completing this course, the course participants will be able to:

- Work effectively in a cohesive team
- Understand the role of digital entrepreneurship in healthcare
- Apply creativity techniques to ideate
- Use utility analysis approaches to select promising solutions
- Develop a value proposition based on techniques like the value proposition canvas or the jobs-to-be-done method
- Apply advanced business modeling methods to develop a sound business concept
- Develop and deliver a concise presentation (“pitch”) to communicate your project
- Gain basic knowledge of healthcare regulations and reimbursement ways

Additional information:

Alternative exam assessment. The grade consists of the presentation and the written elaboration. Potentially, a ‘project diary’ of the seminar progress may be part of the deliverables (depends on tutor and will be communicated at the kick-off).

For a successful course completion, we expect you to submit a Business Plan with the following features:

- Scope: 9000 words,
- Sound and clear structure,
- Expression and spelling are correct
- Complete and correct references, quotations, etc.
- Visual elements are chosen appropriately
- Documentation and traceability of data acquisition, analysis and evaluation,
- Content is developed according to the course instructions.

Furthermore, we expect you to deliver a team Pitch.

- Duration: will be communicated (typically 5-10 minutes)
- Content: Introduction/Purpose; Problem; Solution; Business Model; Prototype; Competition; Management Team; Current Status and next steps,
- Layout and form: appropriate choice,
- Appearance: appropriate amount of visual elements,
- Data: well researched and organized visually
- Story Line: is sound; clear and convincing.

Organizational issues
Tuesday, 23.04.24
Tuesday, 30.04.24
Tuesday, 07.05.24
Tuesday, 28.05.24
Tuesday, 04.06.24
Tuesday, 18.06.24

Registration is via the Wiwi-Portal.

In the seminar you will work on a project in teams of max. 5 persons. Team applications are welcome but not a prerequisite for participation. The seminars will be held in English.

T 7.430 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

Responsible: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture	Heller
Exams					
WT 23/24	7900146 (WS23/24)	Statistical Modeling of generalized regression models			Heller

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Below you will find excerpts from events related to this course:

V Statistical Modeling of Generalized Regression Models

2521350, WS 23/24, 2 SWS, Open in study portal **Lecture (V)**

Content
Learning objectives:

The student has profound knowledge of generalized regression models.

Requirements:

Knowledge of the contents covered by the course *Economics III: Introduction in Econometrics" [2520016].*

Workload:

Total workload for 4.5 CP: approx. 135 hours

Attendance: 30 hours

Preparation and follow-up: 65 hours

T 7.431 Course: Stochastic Calculus and Finance [T-WIWI-103129]

Responsible: Dr. Mher Safarian
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101639 - Econometrics and Statistics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2521331	Stochastic Calculus and Finance	2 SWS	Lecture	Safarian
WT 23/24	2521332	Übungen zu Stochastic Calculus and Finance	2 SWS	Practice	Safarian
Exams					
WT 23/24	7900225	Stochastic Calculus and Finance			Safarian

Competence Certificate
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.).

Prerequisites
None

Annotation
For more information see http://statistik.econ.kit.edu/

Below you will find excerpts from events related to this course:

V Stochastic Calculus and Finance

2521331, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Learning objectives:

After successful completion of the course students will be familiar with many common methods of pricing and portfolio models in finance. Emphasis we be put on both finance and the theory behind it.

Content:

The course will provide rigorous yet focused training in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus: Stochastic Processes, Brownian Motion and Martingales, Entropy, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes, Stable and Levy processes.
2. Mathematical Finance: Pricing Models, The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Incomplete Markets, Markets with Transaction Costs, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem, CAPM), Equilibrium models, Numerical Methods.

Workload:

Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours

Organizational issues
Blockveranstaltung, Termine werden über Ilias bekannt gegeben

Literature

- Dynamic Asset Pricing Theory, Third Edition by D. Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models by S. E. Shreve, Springer, 2003
- Stochastic Finance: An Introduction in Discrete Time by H. Föllmer, A. Schied, de Gruyter, 2011
- Methods of Mathematical Finance by I. Karatzas, S. E. Shreve, Springer, 1998
- Markets with Transaction Costs by Yu. Kabanov, M. Safarian, Springer, 2010
- Introduction to Stochastic Calculus Applied to Finance by D.Lamberton, B. Lapeyre, Chapman&Hall,1996

T 7.432 Course: Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation [T-MACH-113372]

Responsible: Martin Benfer
Prof. Dr.-Ing. Gisela Lanza

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105455 - Strategic Design of Modern Production Systems
M-MACH-106590 - Production Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	1

Events					
ST 2024	2150658	Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation	2 SWS	Seminar / 🗣	Lanza, Benfer
Exams					
ST 2024	76-T-MACH-113372	Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation			Lanza

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment takes the form of an examination with a different type of success check (in accordance with §4(2), 3 SPO). Here, the project work, the milestone-based presentation of the results in presentation form and a final presentation are included in the assessment

Modeled Conditions
You have to fulfill one of 4 conditions:

1. The course T-MACH-110991 - Global Production must have been passed.
2. The course T-MACH-105158 - Global Production and Logistics - Part 1: Global Production must have been passed.
3. The course T-MACH-108848 - Global Production and Logistics - Part 1: Global Production must have been passed.
4. The course T-MACH-110337 - Global Production and Logistics must have been passed.

Recommendation
Participation in the following lectures:
Integrated Production Planning in the Age of Industry 4.0 [2150660]
Introduction to Operations Research I [2550040] + II [2530043]

Below you will find excerpts from events related to this course:

V Strategic Decision-Making in Global Production Network Design: A Seminar on Optimization and Simulation

Seminar (S)
On-Site

2150658, SS 2024, 2 SWS, Language: English, Open in study portal

Content
The lecture "Strategic Decision Making in the Design of Global Production Networks: A Seminar in Optimization and Simulation" offers students a comprehensive insight into the application of quantitative models from operations research in global production networks. The course places special emphasis on practical applications and allows students to deepen their skills through a real-world use case during the semester.

The classroom sessions serve to convey important basics and to introduce and present the practice-relevant cases. In the self-study phase, the topics covered are worked on in greater depth. The curriculum covers various phases. Optimization techniques for network design are covered first, followed by simulation methods for network management. Subsequently, open questions are dealt with, e.g. from the consideration of uncertainty, sustainability aspects or the search for the overall optimum in the production network.

The students are divided into small groups to work together on the questions. The methods taught in the course are implemented in python. In order to strengthen the students' presentation skills, regular presentations of interim results are planned. The progress made is supported by feedback and interaction with an internationally operating consulting firm.

The practical orientation of the course, combined with the application of quantitative models and the use of Python, enables students to prepare holistically for complex challenges in global production.

Learning Outcomes:

The Students are able to

1. **put concepts of global production into practice:**
   • Understand how global production networks can be implemented in real business scenarios.
   • Develop and implement strategies for adapting global production networks to specific business requirements.
2. **in-depth knowledge and use of optimization in global production:**
   • Develop an in-depth understanding of various optimization techniques in global production processes.
   • Apply optimization models to complex production networks and continuously improve them.
3. **approach to improving network configuration, site selection and transportation routes:**
   • Understand methods to evaluate and optimize production networks.
   • Effectively plan and improve site selection decisions and transportation routes.
4. **deepen knowledge and use of simulations in global production:**
   • Understand how simulations can be used as a tool to analyze and optimize global production processes.
   • Gain experience in the application of simulation techniques for modeling and analyzing production processes.
5. **approach to improving delivery reliability:**
   • Develop and implement strategies to improve delivery reliability.
   • Optimize processes that can affect delivery reliability.
6. **consider uncertainties, aspects of sustainability and multidimensionality:**
   • Recognize and manage uncertainties in global production environments.
   • Consider sustainability aspects and multidimensional challenges when making decisions in global production.
7. **linking results and models:**
   • Link models and analytical results to create holistic solutions to complex problems in global production.
   • Strengthen the ability to iteratively improve models based on real-world results.
8. **presentations to management:**
   • Present complex global manufacturing concepts to management in an understandable and persuasive manner.
   • Build confidence in the use of visual aids and effective communication techniques in front of management levels.

Workload:

regular attendance: ~ 30 hours
self-study: ~ 99 hours

Organizational issues
Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Studierende begrenzt. Termine und Fristen zur Veranstaltung werden über die Homepage des wbk (https://www.wbk.kit.edu/studium-und-lehre.php) bekannt gegeben.

For organizational reasons the number of students is limited to 20. Dates and deadlines for the seminar will be announced via the homepage of wbk (https://www.wbk.kit.edu/studium-und-lehre.php).

Literature
Vorlesungsskript der Lehrveranstaltungen / Lecture notes of the courses:
Abele et al. (2008): Global Production [978-3-540-71652-5]
Domschke et al. (2015): Einführung in das Operations Research [Einführung in Operations Research]
Friedli et al. (2021): Global Manufacturing Management: From Excellent Plants Toward Network Optimization [978-3-030-72739-0]

T 7.433 Course: Strategic Transport Planning [T-BGU-103426]

Responsible: Volker Waßmuth
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	6232808	Strategic Traffic Planning	2 SWS	Lecture / 🗣	Waßmuth
Exams					
WT 23/24	8240103426	Strategic Transport Planning			Vortisch

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.434 Course: Strategy and Management Theory: Developments and “Classics” [T-WIWI-106190]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
ST 2024	2577921	Strategy and Management Theory: Developments and "Classics" (Master)	2 SWS	Seminar / 🗣	Lindstädt

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a conclusion meeting. Details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V **Strategy and Management Theory: Developments and "Classics" (Master)** — **Seminar (S) On-Site**
2577921, SS 2024, 2 SWS, Language: German, Open in study portal

Content
This course covers highly topical issues of great relevance to the management of organizations. Students will be enabled to take strategic management positions. By applying appropriate models from the fields of strategy and management - or models developed in-house - participants will learn to evaluate the strategic starting position of an organization and derive precise and well-founded recommendations for action based on this.

This course offers students the opportunity to explore current management issues and sharpen their skills in strategic analysis and evaluation. Through intensive collaboration and practical application of the knowledge learned, students are optimally prepared for the demands and challenges of modern business management.

Structure

The course begins with an overarching theme, based on which students are divided into groups of two. The core of the course consists of the preparation of a written paper as well as the presentation and discussion of the results.

Learning Objectives

Upon completion of the course, students will be able to,

- analyze complex business situations, think strategically and derive sound management decisions.
- compose clear and convincing written papers that accurately present the analyses and recommendations developed.
- present results in an engaging manner and actively participate in substantive discussions.

Recommendations:

Prior attendance of the Bachelor's module "Strategy and Organization" or another module with comparable content at another university is recommended.

Workload:

Total effort approx. 90 hours

Attendance time: 15 hours

Preparation and follow-up: 75 hours

Examination and preparation: not applicable

Verification:

The success control according to § 4(2), 3 SPO is done by writing a scientific paper and a presentation of the results of the paper in the context of a final event. Details on the design of the performance review will be announced during the lecture.

Annotation:

The course is admission restricted. In case of prior admission to another course in the module "Strategy and Management: Advanced Topics" [M-WIWI-103119], participation in this course is guaranteed. For more information on the application process, see the IBU website.

Exams are offered at least every other semester, so the entire module can be completed in two semesters.

Organizational issues
siehe Homepage

T 7.435 Course: Structural and Phase Analysis [T-MACH-102170]

Responsible: Dr.-Ing. Susanne Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Exams			
WT 23/24	76-T-MACH-102170	Structural and Phase Analysis	Wagner, Hinterstein
ST 2024	76-T-MACH-102170	Structural and Phase Analysis	Wagner

Competence Certificate
Oral examination

Prerequisites
none

T 7.436 Course: Successful Transformation Through Innovation [T-WIWI-111823]

Responsible: Malte Busch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Competence Certificate
Alternative exam assessments. The grade consists of an presentation of the results (50%) and a seminar paper (50%).

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

T 7.437 Course: Superhard Thin Film Materials [T-MACH-102103]

Responsible: Prof. Sven Ulrich
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	3

Events					
WT 23/24	2177618	Superhard Thin Film Materials	2 SWS	Lecture / 🗣	Ulrich
Exams					
WT 23/24	76-T-MACH-102103	Superhard Thin Film Materials			Ulrich

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral examination (ca. 30 Minuten)

Prerequisites
none

Below you will find excerpts from events related to this course:

V **Superhard Thin Film Materials** — **Lecture (V) On-Site**
2177618, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
oral examination (about 30 min), no tools or reference materials

Teaching Content:

Introduction

Basics

Plasma diagnostics

Particle flux analysis

Sputtering and ion implantation

Computer simulations

Properties of materials, thin film deposition technology,
thin film analysis and modelling of superhard materials

Amorphous hydrogenated carbon

Diamond like carbon

Diamond

Cubic Boronnitride

Materials of the system metall-boron-carbon-nitrogen-silicon

regular attendance: 22 hours
self-study: 98 hours

Superhard materials are solids with a hardness higher than 4000 HV 0,05. The main topics of this lecture are modelling, deposition, characterization and application of superhard thin film materials.

Recommendations: none

Organizational issues
Falls die Vorlesung online stattfinden muss, bitte um Anmeldung unter sven.ulrich@kit.edu bis zum 23.10.23.

Den entsprechenden MS Teams Link erhalten Sie dann per E-Mail am 25.10.23.

Literature
G. Kienel (Herausgeber): Vakuumbeschichtung 1 - 5, VDI Verlag, Düsseldorf, 1994

Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed

T 7.438 Course: Supplement Enterprise Information Systems [T-WIWI-110346]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate
The assessment of this course is a written or (if necessary) oral examination.

Prerequisites
None

Annotation
This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but is not equivalent to another course of this topic.

T 7.439 Course: Supplement Software- and Systemsengineering [T-WIWI-110372]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each term	1

Competence Certificate
The assessment of this course is a written or (if necessary) oral examination.

Prerequisites
None

Annotation
This course can be used in particular for the acceptance of external courses whose content is in the broader area of software and systems engineering, but cannot assigned to another course of this topic.

T 7.440 Course: Supply Chain Management in the Automotive Industry [T-WIWI-102828]

Responsible: Tilman Heupel
Hendrik Lang
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	see Annotations	1

Exams			
WT 23/24	7981957	Supply Chain Management in the Automotive Industry	Schultmann
ST 2024	7981957	Supply Chain Management in the Automotive Industry	Schultmann

Competence Certificate
The examination will be offered for the last time in the summer semester 2024. Success is assessed in the form of an oral (30 minutes) or written (60 minutes) examination (in accordance with SPO § 4(2)).

Prerequisites
None

Recommendation
None

Annotation
The lecture is no longer offered.

T 7.441 Course: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]

Responsible: Claus J. Bosch
Dr. Mathias Göbelt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Grading scale	Recurrence	Version
Written examination	3,5	Grade to a third	Each summer term	1

Events					
ST 2024	2581961	Supply Chain Management with Advanced Planning Systems	2 SWS	Lecture / 🗣	Göbelt, Bosch
Exams					
WT 23/24	7981961	Supply Chain Management with Advanced Planning Systems			Schultmann

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of an oral (30 minutes) or written exam (60 minutes) (following §4(2) of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Depending on the respective pandemic situation, the exam may be offered as an open book exam (alternative exam assessment, following §4(2), 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Supply Chain Management with Advanced Planning Systems

2581961, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
This lecture deals with supply chain management from a practitioner's perspective with a special emphasis Advanced Planning Systems (APS) and the planning domain. The software solution SAP SCM, one of the most widely used Advanced Planning Systems, is used as an example to show functionality and application of an APS in practice.

First, the term supply chain management is defined and its scope is determined. Methods to analyze supply chains as well as indicators to measure supply chains are derived. Second, the structure of an APS (advanced planning system) is discussed in a generic way. Later in the lecture, the software solution SAP SCM is mapped to this generic structure. The individual planning tasks and software modules (demand planning, supply network planning / sales & operations planning, production planning / detailed scheduling, deployment, transportation planning, global available-to-promise) are presented by discussing the relevant business processes, providing academic background, describing typical planning processes and showing the user interface and user-related processes in the software solution. At the end of the lecture, implementation methodologies and project management approaches for SAP SCM are covered.

Contents

1. Introduction to Supply Chain Management

1.1. Supply Chain Management Fundamentals

1.2. Supply Chain Management Analytics

2. Structure of Advanced Planning Systems

3. SAP SCM

3.1. Introduction / SCM Solution Map

3.2. Demand Planning

3.3. Supply Network Planning / Sales & Operations Planning

3.4. Production Planning and Detailed Scheduling

3.5. Deployment

3.6. Transportation Planning / Global Available to Promise

3.7. Cloud-based Supply Chain Planning

4. SAP SCM in Practice

4.1. Project Management and Implementation

4.2. SAP Implementation Methodology

Literature
will be announced in the course

T 7.442 Course: Sustainability in Mobility Systems [T-BGU-111057]

Responsible: PD Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 23/24	6232906	Sustainability in Mobility Systems	2 SWS	Lecture / 🗣	Kagerbauer, Plötz, Gnann
Exams					
WT 23/24	8245111057	Sustainability in Mobility Systems			Kagerbauer

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min., computer-based

Prerequisites
none

Recommendation
none

Annotation
none

T 7.443 Course: Sustainable Vehicle Drivetrains [T-MACH-111578]

Responsible: Prof. Dr. Thomas Koch
Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2133132	Sustainable Vehicle Drivetrains	2 SWS	Lecture / 🗣	Toedter
Exams					
WT 23/24	76-T-MACH-105655	Sustainable Vehicle Drivetrains			Toedter

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam (approx. 20 minutes)

Prerequisites
none

Annotation
Starting in winter term 25/26, the course consists of a lecture (2h / week) and a tutorial (1 h / week).

Below you will find excerpts from events related to this course:

V Sustainable Vehicle Drivetrains

2133132, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Sustainability
Environmental balance
Legislation
Alternative fuels
BEV
Fuel cell
Hybrid drives

T 7.444 Course: System Integration in Micro- and Nanotechnology [T-MACH-105555]

Responsible: apl. Prof. Dr. Ulrich Gengenbach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2024	2106033	System Integration in Micro- and Nanotechnology I	2 SWS	Lecture / 🗣	Gengenbach
Exams					
WT 23/24	76-T-MACH-105555	System Integration in Micro- and Nanotechnology			Gengenbach

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam (Duration: 30 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V System Integration in Micro- and Nanotechnology I

2106033, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Content:

- Introduction to system integration (fundamentals)
- Brief introduction to MEMS processes
- Flexures
- Surfaces and plasma processes for surface treatment
- Adhesive bonding in engineering
- Mounting techniques in electronics
- Molded Interconnect devices (MID)
- Functional Printing
- Low temperature cofired ceramics in system integration

Learning objectives:

The students acquire basic knowledge of challenges and system integration technologies from mechanical engineering, precision engineering and electronics.

Literature

- A. Risse, Fertigungsverfahren der Mechatronik, Feinwerk- und Präzisionsgerätetechnik, Vieweg+Teubner Verlag, Wiesbaden, 2012
- M. Madou, Fundamentals of microfabrication and nanotechnology, CRC Press Boca Raton, 2012
- G. Habenicht, Kleben Grundlagen, Technologien, Anwendungen, Springer-Verlag Berlin Heidelberg, 2009
- J. Franke, Räumliche elektronische Baugruppen (3D-MID), Carl Hanser-Verlag München, 2013

T 7.445 Course: System Integration in Micro- and Nanotechnology 2 [T-MACH-110272]

Responsible: apl. Prof. Dr. Ulrich Gengenbach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2105040	System Integration in Micro- and Nanotechnology 2	2 SWS	Lecture / 🗣	Gengenbach
Exams					
WT 23/24	76-T-MACH-110272	System Integration in Micro- and Nanotechnology 2			Gengenbach

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, approx. 15 min.

Prerequisites
None

Below you will find excerpts from events related to this course:

V System Integration in Micro- and Nanotechnology 2

2105040, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Introduction to system integration (novel processes and applications)

Assembly of hybrid microsystems

Packaging processes

Applications:

- Lab-on-chip systems
- Microoptical systems
- Silicon Photonics

Novel integration processes:

- Direct Laser Writing
- Self Assembly

Learning objectives

The students acquire knowledge of novel system integration technologies and their application in microoptic and microfluidic systems.

Literature
N.-T. Nguyen, Fundamentals and Applications of Microfluidics, Artech House

G. T. Reed, Silicon Photonics: An Introduction, Wiley

T 7.446 Course: Systematic Materials Selection [T-MACH-100531]

Responsible: Dr.-Ing. Stefan Dietrich
Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	5

Events					
ST 2024	2174576	Systematic Materials Selection	3 SWS	Lecture / 🗣	Dietrich
ST 2024	2174577	Excercises in Systematic Materials Selection	1 SWS	Practice / 🗣	Dietrich
Exams					
WT 23/24	76-T-MACH-100531	Systematic Materials Selection			Dietrich
ST 2024	76-T-MACH-100531	Systematic Materials Selection			Dietrich

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment is carried out as a written exam of 2 h.

Prerequisites
None.

Recommendation
It is strongly recommended to pass the two courses "Materials Science I" (T-MACH-102078) and "Materials Science II" (T-MACH-102079).

Below you will find excerpts from events related to this course:

V Systematic Materials Selection

2174576, SS 2024, 3 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are deeloped. The following topics are covered:

- Information and introduction
- Necessary basics of materials
- Selected methods / approaches of the material selection
- Examples for material indices and materials property charts
- Trade-off and shape factors
- Sandwich materials and composite materials
- High temperature alloys
- Regard of process influences
- Material selection for production lines
- Incorrect material selection and the resulting consequences
- Abstract and possibility to ask questions

learning objectives:
The students are able to select the best material for a given application. They are proficient in selecting materials on base of performance indices and materials selection charts. They can identify conflicting objectives and find sound compromises. They are aware of the potential and the limits of hybrid material concepts (composites, bimaterials, foams) and can determine whether following such a concept yields a useful benefit.
requirements:

WiIng SPO 2007 (B.Sc.)

The course Material Science I [21760] has to be completed beforehand.

WiIng (M.Sc.)

The course Material Science I [21760] has to be completed beforehand.

workload:

The workload for the lecture is 120 h per semester and consists of the presence during the lecture (30 h) as well as preparation and rework time at home (30 h) and preparation time for the oral exam (60 h).

Literature
Vorlesungsskriptum; Übungsblätter; Lehrbuch: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.);
Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen
Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006
ISBN: 3-8274-1762-7

Lecture notes; Problem sheets; Textbook: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.);
Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen
Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006
ISBN: 3-8274-1762-7

T 7.447 Course: Tax Law [T-INFO-111437]

Responsible: Detlef Dietrich
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	24646	Tax Law	2 SWS	Lecture / 🗣	Dietrich
Exams					
WT 23/24	7500062	Tax Law			Sattler, Matz
ST 2024	7500120	Tax Law			Sattler

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.448 Course: Technologies for Innovation Management [T-WIWI-102854]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Each winter term	2

Competence Certificate
Presentation and individual paper (ca. 15 pages) as alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovationsmanagement: Konzepte, Strategien und Methoden is recommended.

T 7.449 Course: Technology Assessment [T-WIWI-102858]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	see Annotations	1

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.

T 7.450 Course: Telecommunications and Internet – Economics and Policy [T-WIWI-113147]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101409 - Electronic Markets

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2561232	Telecommunication and Internet - Economics and Policy	2 SWS	Lecture /	Mitusch
WT 23/24	2561233	Excercises to Telecommunication and Internet - Economics and Policy	1 SWS	Practice /	Mitusch, Wisotzky, Corbo
Exams					
WT 23/24	7900246	Telecommunications and Internet – Economics and Policy			Mitusch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Students' understanding and knowledge will be assessed through either an oral or a written exam. The actual method used will be announced during the course. The course takes place every winter term, and exams are offered two times a year, in March and in September.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102713 - Telecommunication and Internet Economics must not have been started.

Recommendation
Basic knowledge of microeconomics is a precondition. Further knowledge of industrial economics or networks economics is useful, but not necessary. No prior knowledge of telecommunications or internet technologies is required.

Annotation
Disclaimer:
German wording is sometimes provided in parallel. Some German original literature is used (especially official and legislative texts) where we will try to provide English translations in parallel.

Below you will find excerpts from events related to this course:

V Telecommunication and Internet - Economics and Policy

2561232, WS 23/24, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
Blended (On-Site/Online)

Content
Description:

The course provides students with a comprehensive understanding of the economic principles, dynamics, and policies that govern the telecommunication and internet industries and markets. It focuses on the infrastructure of the internet, both physical and logical.

Course Objectives:

Understand the telecommunication and internet landscape: Students will be introduced to the historical development, evolution, and current state of the telecommunication and internet industries. This includes technology, industrial organization, regulation, and other policies. Students will explore the emergence of modern telecommunication networks, the birth of the internet, and key milestones that have shaped the global communication landscape.

Examine network economics: Students will explore the unique economic characteristics of telecommunications networks, including network effects, economies of scale, the implications for investment decisions and market entry barriers, and regulatory responses.

Analyse market structures and competition policies: Students will dive into the various market structures that exist within the telecommunication and internet industries, including: access to the internet by users, access to the infrastructure by firms, economic interactions between the autonomous systems (i.e. sub-networks) and other players (like internet exchange points) of the internet, implications for quality of services and network neutrality. Emphasis will be placed on competitiveness of markets, resp. market power, on the role of regulation, and how they impact market dynamics.

Investigate infrastructure investment and policy: The course will address the significant role of infrastructure investment in the telecommunication and internet sectors. Students will analyse the economic drivers behind infrastructure construction, government policies, and regulatory frameworks that influence investment decisions.

Address emerging trends: The course will address the latest trends and technologies in telecommunication and the internet, such as 5G, Internet of Things (IoT), and cloud computing, content delivery networks, and their economic implications.

Assess platform economics: The role of digital platforms in the telecommunication and internet industries will be addressed. Students will understand platform business models and the economics of multisided markets. In this context, the "hypergiants" of the internet get into the focus as well as the challenges and opportunities they present.

Teaching Methodology:

The course will adopt a combination of lectures, case studies, and guest lectures from (industry) experts. Real-world examples will be used to illustrate economic principles in action within the telecommunication and internet sectors. A few economic models will be analysed, but most of the issues will be addressed verbally.

T 7.451 Course: Telecommunications Law [T-INFO-101309]

Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	24632	Telekommunikationsrecht	2 SWS	Lecture / 🗣	Döveling
Exams					
WT 23/24	7500049	Telecommunications Law			Zufall
ST 2024	7500085	Telecommunications Law			Zufall

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.452 Course: Tendering, Planning and Financing in Public Transport [T-BGU-101005]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each term	1

Events					
ST 2024	6232807	Competition, Planning and Financing in Public Transport	2 SWS	Lecture / 🗣	Pischon

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.453 Course: Tires and Wheel Development for Passenger Cars [T-MACH-102207]

Responsible: Prof. Dr.-Ing. Günter Leister
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2114845	Tires and Wheel Development for Passenger Cars	2 SWS	Lecture / 🗣	Leister
Exams					
WT 23/24	76-T-MACH-102207	Tires and Wheel Development for Passenger Cars			Leister
ST 2024	76-T-MACH-102207	Tires and Wheel Development for Passenger Cars			Leister

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events related to this course:

V Tires and Wheel Development for Passenger Cars

2114845, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content

1. The role of the tires and wheels in a vehicle
2. Geometrie of Wheel and tire, Package, load capacity and endurance, Book of requirement
3. Mobility strategy, Minispare, runflat systems and repair kit.
4. Project management: Costs, weight, planning, documentation
5. Tire testing and tire properties
6. Wheel technology incuding Design and manifacturing methods, Wheeltesting
7. Tire presssure: Indirect and direct measuring systems
8. Tire testing subjective and objective

Learning Objectives:

The students are informed about the interactions of tires, wheels and chassis. They have an overview of the processes regarding the tire and wheel development. They have knowledge of the physical relationships.

Organizational issues
Voraussichtliche Termine, nähere Informationen und eventuelle Terminänderungen:

siehe Institutshomepage.

Literature
Manuskript zur Vorlesung

Manuscript to the lecture

T 7.454 Course: Topics in Experimental Economics [T-WIWI-102863]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101505 - Experimental Economics

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Irregular	1

Events					
ST 2024	2560232	Topics in Experimental Economics	2 SWS	Lecture / 🗣	Reiß, Peters
ST 2024	25602333	Übungen zu Topics in Experimental Economics	1 SWS	Practice / 🗣	Reiß, Peters

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

Annotation
The course is offered in summer 2020 for the next time, not in summer 2018.

T 7.455 Course: Topics in Stochastic Optimization [T-WIWI-112109]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming
M-WIWI-101637 - Analytics and Statistics
M-WIWI-102832 - Operations Research in Supply Chain Management
M-WIWI-103289 - Stochastic Optimization

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each winter term	1

Competence Certificate
Students will be given problem sets on which they work in groups. The problem sets will involve the implementation of the models presented in the course, and exploring features of these models. The groups will present their findings in front of the class. The grading will be based on the presentation.

Recommendation
A solid understanding of Stochastic Optimization and/or Optimization under Uncertainty as well as optimization in general is highly recommended, since we will heavily build upon basics of these areas.

T 7.456 Course: Trademark and Unfair Competition Law [T-INFO-101313]

Responsible: Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	1

Events					
WT 23/24	24136	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
ST 2024	24609	Trademark and Unfair Competition Law	2 SWS	Lecture / 🗣	Matz
Exams					
WT 23/24	7500061	Trademark and Unfair Competition Law			Matz
ST 2024	7500051	Trademark and Unfair Competition Law			Matz

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.457 Course: Traffic Engineering [T-BGU-101798]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6232703	Straßenverkehrstechnik	2 SWS	Lecture / Practice (/	Vortisch, Mitarbeiter/innen
Exams					
WT 23/24	8240101798	Traffic Engineering			Vortisch
ST 2024	8240101798	Traffic Engineering			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

Below you will find excerpts from events related to this course:

V Straßenverkehrstechnik

6232703, WS 23/24, 2 SWS, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture teaches basic principles and skills necessary to understand the methods and tools of traffic engineering, including theoretical background information as well as application of the relevant manuals and guidelines.

- Applications of traffic engineering: design of infrastructure and traffic control
- Description and analysis of traffic flow: Basic principles (kinematics, measurements of traffic flows, microscopic and macroscopic traffic parameters, Fundamental diagram)
- Methods in traffic engineering: travel demand structure, traffic flow characteristics, Queuing theory, Level-of-Service-concepts
- Capacity analysis for intersections with and without signalisation (entries and weaving sections, roundabouts and signal-controlled intersection),
- Backgrounds and application of the German Highway Capacity Manual
- Design of signal control (Fixed time signal controls, vehicle actuated control, „green waves“, network control, progressive signal systems) including public transport (prioritizing systems) and other transport modes (bicycles, pedestrians)
- Introduction to traffic management (for more detailed information see lecture “Transport Management and Transport Telematics [6232802])

Coordination: Baumann, Marvin

T 7.458 Course: Traffic Flow Simulation [T-BGU-101800]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6232804	Traffic Simulation	2 SWS	Lecture / Practice (/	Vortisch, Mitarbeiter/innen
Exams					
WT 23/24	8240101800	Traffic Flow Simulation			Vortisch
ST 2024	8240101800	Traffic Flow Simulation			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

Below you will find excerpts from events related to this course:

V Traffic Simulation

6232804, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The lecture teaches basic principles and application of traffic flow simulation tools in traffic engineering and transport planning.

This includes application of simulation software as well as the knowledge about models and how to deal with the stochastic nature of simulation results.

The lecture teaches the application of microscopic traffic flow simulation using the simulation software PTV Vissim, combining practical and theoretical aspects. Theoretical aspects include car following models, lane changing behavior and route choice models. Calibration and validation of the models will be explained and demonstrated by practical examples. Furthermore, German and American guidelines for the application of simulation models will be discussed and background information will be given.

In addition to the lectures, students will build a microscopic traffic flow model of an intersection. The aim is to practically apply what has been learned and to deepen the modeling knowledge.

Coordination: Grau, Josephine

T 7.459 Course: Traffic Management and Transport Telematics [T-BGU-101799]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	6232802	Traffic Management and Telematics	2 SWS	Lecture / Practice (/	Vortisch
Exams					
WT 23/24	8240101799	Traffic Management and Transport Telematics			Vortisch
ST 2024	8240101799	Traffic Management and Transport Telematics			Vortisch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.460 Course: Transport Economics [T-WIWI-100007]

Responsible: Prof. Dr. Kay Mitusch
Dr. Eckhard Szimba

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101406 - Network Economics
M-WIWI-101468 - Environmental Economics
M-WIWI-101485 - Transport Infrastructure Policy and Regional Development

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each summer term	1

Events					
ST 2024	2560230	Transport Economics	2 SWS	Lecture	Mitusch, Szimba
ST 2024	2560231	Übung zu Transportökonomie	1 SWS	Practice	Mitusch, Szimba, Wisotzky
Exams					
WT 23/24	7900232	Transport Economics			Mitusch

Competence Certificate
The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC).
Examination is offered every semester and can be retried at any regular examination date.

Below you will find excerpts from events related to this course:

V Transport Economics

2560230, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticans and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport
- empirical analysis of transport demand
- assessment of transport infrastructure projects
- external effects in transport
- transport policy
- cost structures of transport infrastructure
- Project evaluation from the perspective of the public sector

Literature
Literatur:

Aberle, G: Transportwirtschaft: einzelwirtschaftliche und gesamtwirtschaftliche Grundlagen München; Wien: Oldenbourg, 2003.

Blauwens, G., De Baere, P. and Van der Voorde, E. (2006): Transport Economics.

Frerich, J; Müller, G: Europäische Verkehrspolitik, Landverkehrspolitik München; Wien: Oldenbourg, 2004.

Dasgupta, A, Pearce, D (1972): Cost-Benefit Analysis, MacMillan, London.

Europäische Kommission (2008): Guide to Cost Benefit Analysis of Investment Projects, online unter http://ec.europa.eu/regional_policy/sources/Ben-Akiva, M., Meerseman, H., and Van de Voorde, E. (2008): Recent developments in transport modelling: Lessons for the freight sector.

Ortúzar, J. d. D. and Willumsen, L. (1990): Modelling Transport.

T 7.461 Course: Transportation Data Analysis [T-BGU-100010]

Responsible: PD Dr.-Ing. Martin Kagerbauer
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6232901	Empirische Daten im Verkehrswesen	2 SWS	Lecture / Practice (/	Kagerbauer
Exams					
WT 23/24	8245100010	Transportation Data Analysis			Kagerbauer
ST 2024	8240100010	Transportation Data Analysis			Kagerbauer

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.462 Course: Transportation Systems [T-BGU-106610]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	6200406	Transportation Systems	2 SWS	Lecture / 🗣	Vortisch
Exams					
WT 23/24	8230106610	Transportation Systems			Vortisch

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.463 Course: Trustworthy Emerging Technologies [T-WIWI-113026]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4,5	Grade to a third	Each summer term	1

Events					
WT 23/24	2511404	Trustworthy Emerging Technologies		Lecture /	Sunyaev, Lins
ST 2024	2511404	Trustworthy Emerging Technologies		Lecture /	Sunyaev, Lins
Exams					
WT 23/24	7900280	Trustworthy Emerging Technologies			Sunyaev

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO). Details will be announced in the respective course.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-109251 - Selected Issues in Critical Information Infrastructures must not have been started.

T 7.464 Course: Tunnel Construction and Blasting Engineering [T-BGU-101846]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	6241903	Tunnelbau und Sprengtechnik	2 SWS	Lecture / 🗣	Haghsheno, Scheuble
Exams					
WT 23/24	8240101846	Tunnel Construction and Blasting Engineering			Haghsheno

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

Recommendation
None

Annotation
None

T 7.465 Course: Turnkey Construction [T-BGU-111921]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-101884 - Lean Management in Construction
M-BGU-101888 - Project Management in Construction
M-BGU-105592 - Digitalization in Facility Management

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each term	1 terms	1

Events					
ST 2024	6241808	Turnkey Construction	2 SWS	Lecture / Practice (/ 🗣	Teizer
Exams					
WT 23/24	8240111921	Turnkey Construction			Haghsheno

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.466 Course: Tutoring: Training and Practice [T-WIWI-112967]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	2	pass/fail	Each term	1

Competence Certificate

- Successful participation in the KIT-PEBA tutor training course "Start in die Lehre": 2 credit points.
- Successful participation in the tutor training course "Start in die Lehre" and supplementary tutoring activity over at least two semesters: 3 credit points.

Annotation
The successful participation in the tutor training "Start in die Lehre" of KIT-PEBA can be credited in the seminar module WiIng/TVWL M.Sc. as interdisciplinary qualification with two or three credit points.

The online application with further information can be found at https://portal.wiwi.kit.edu/forms/form/AnerkennungTutorent%C3%A4tigkeit.

T 7.467 Course: Upgrading of Existing Buildings [T-BGU-111218]

Responsible: Prof. Dr.-Ing. Kunibert Lennerts
Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences
Part of: M-BGU-106453 - Facility Management in Hospitals for Industrial Engineering

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	3	Grade to a third	Each term	1 terms	1

Events					
WT 23/24	6240901	Bauen im Bestand	3 SWS	Lecture / Practice (/ 🗣	Lennerts, Schneider
Exams					
WT 23/24	8240111218	Upgrading of Existing Buildings			Lennerts, Schneider

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.468 Course: Urban Water Technologies [T-BGU-112365]

Responsible: Dr.-Ing. Mohammad Ebrahim Azari Najaf Abad
PD Dr.-Ing. Stephan Fuchs

Organisation: KIT Department of Civil Engineering, Geo and Environmental Sciences

Part of: M-BGU-104448 - Urban Water Technologies

Type	Credits	Grading scale	Recurrence	Expansion	Version
Oral examination	9	Grade to a third	Each term	1 terms	1

Events					
WT 23/24	6223701	Urban Water Infrastructure and Management	4 SWS	Lecture / Practice (/ 🗣	Fuchs
WT 23/24	6223801	Wastewater Treatment Technologies	4 SWS	Lecture / Practice (/ 🗣	Fuchs, Azari Najaf Abad

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam, appr. 30 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.469 Course: Valuation [T-WIWI-102621]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Each winter term	1

Events					
WT 23/24	2530212	Valuation	2 SWS	Lecture / 🗣	Ruckes
WT 23/24	2530213	Übungen zu Valuation	1 SWS	Practice / 🗣	Ruckes, Luedecke
Exams					
WT 23/24	7900057	Valuation			Ruckes
ST 2024	7900072	Valuation			Ruckes

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Valuation

2530212, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Literature
Weiterführende Literatur

Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T 7.470 Course: Vehicle Comfort and Acoustics I [T-MACH-105154]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each winter term	1

Events					
WT 23/24	2113806	Vehicle Comfort and Acoustics I	2 SWS	Lecture / 🗣	Gauterin
ST 2024	2114856	Vehicle Ride Comfort & Acoustics I	2 SWS	Lecture / 💻	Gauterin
Exams					
WT 23/24	76-T-MACH-105154	Vehicle Comfort and Acoustics I			Gauterin
ST 2024	76-T-MACH-105154	Vehicle Comfort and Acoustics I			Gauterin

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral Examination

Duration: approx. 30 to 40 minutes

Auxiliary means: none

Prerequisites
Can not be combined with lecture T-MACH-102206

Below you will find excerpts from events related to this course:

V Vehicle Comfort and Acoustics I

2113806, WS 23/24, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Content
1. Perception of noise and vibrations
3. Fundamentals of acoustics and vibrations
3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations
4. The relevance of tire and chasis for the acoustic and mechanical driving comfort:
phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

Learning Objectives:

The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings.
They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

Organizational issues
Das Vorlesungsmaterial wird auf ILIAS bereitgestellt. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/Passwoerterllias/

Kann nicht mit der Veranstaltung [2114856] kombiniert werden.

Can not be combined with lecture [2114856]

Literature
1. Michael Möser, Technische Akustik, Springer, Berlin, 2005

2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

3. Manfred Mitschke, Dynamik der Kraftfahrzeuge, Band B: Schwingungen, Springer, Berlin, 1997

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt

V

Vehicle Ride Comfort & Acoustics I

2114856, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
Online

Content
1. Perception of noise and vibrations

3. Fundamentals of acoustics and vibrations

3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations

4. The relevance of tire and chasis for the acoustic and mechanical driving comfort:
phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

Learning Objectives:

The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings.
They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

Organizational issues
the lectures are available as a video stream.

You will find the lecture material and the videos on ILIAS. To get the ILIAS password, refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Kann nicht mit der Veranstaltung [2113806] kombiniert werden.

Can not be combined with lecture [2113806]

Literature
1. Michael Möser, Technische Akustik, Springer, Berlin, 2005

2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

3. Manfred Mitschke, Dynamik der Kraftfahrzeuge, Band B: Schwingungen, Springer, Berlin, 1997

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt

T 7.471 Course: Vehicle Comfort and Acoustics II [T-MACH-105155]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

Type	Credits	Grading scale	Recurrence	Version
Oral examination	3	Grade to a third	Each summer term	1

Events					
ST 2024	2114825	Vehicle Comfort and Acoustics II	2 SWS	Lecture /	Gauterin
ST 2024	2114857	Vehicle Ride Comfort & Acoustics II	2 SWS	Lecture /	Gauterin
Exams					
WT 23/24	76-T-MACH-105155	Vehicle Comfort and Acoustics II			Gauterin
ST 2024	76-T-MACH-105155	Vehicle Comfort and Acoustics II			Gauterin

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Oral Examination

Duration: approx. 30 to 40 minutes

Auxiliary means: none

Prerequisites
Can not be combined with lecture T-MACH-102205

Below you will find excerpts from events related to this course:

V Vehicle Comfort and Acoustics II

2114825, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
Online

Content
1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
- phenomena
- influencing parameters
- types of construction
- optimization of components and systems
- conflicts of goals
- methods of development

3. Noise emission of motor vehicles
- noise stress
- sound sources and influencing parameters
- legal restraints
- optimization of components and systems
- conflict of goals
- methods of development

Learning Objectives:

The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

Organizational issues
Die Vorlesung wird als Videostream zur Verfügung gestellt. Sie finden den Videostream und das Vorlesungsmaterial auf ILIAS. Das ILIAS-Passwort erhalten Sie unter https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Kann nicht mit der Veranstaltung [2114857] kombiniert werden.

Can not be combined with lecture [2114857]

Literature
Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.

V **Vehicle Ride Comfort & Acoustics II** **Lecture (V)**
2114857, SS 2024, 2 SWS, Language: English, Open in study portal **Online**

Content
1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
- phenomena
- influencing parameters
- types of construction
- optimization of components and systems
- conflicts of goals
- methods of development

3. Noise emission of motor vehicles
- noise stress
- sound sources and influencing parameters
- legal restraints
- optimization of components and systems
- conflict of goals
- methods of development

Learning Objectives:

The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

Organizational issues
the lectures are available as a video stream.

You will find the lecture material and the videos on ILIAS. To get the ILIAS password, refer to https://fast-web-01.fast.kit.edu/PasswoerterIlias/

Can not be combined with lecture [2114825].

Literature
Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.

The script will be supplied in the lectures.

T 7.472 Course: Vehicle Systems for Urban Mobility [T-MACH-113069]

Responsible: Prof. Dr.-Ing. Martin Cichon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106496 - Modern Mobility on Rails and Roads

Type	Credits	Grading scale	Version
Oral examination	4,5	Grade to a third	3

Events					
WT 23/24	2115922	Vehicle Systems for Urban Mobility	2 SWS	Lecture / 🗣	Cichon
ST 2024	2115922	Vehicle Systems for Urban Mobility	2 SWS	Lecture / 🗣	Cichon, Berthold
Exams					
WT 23/24	76-T-MACH-106428	Vehicle Systems for Urban Mobility			Cichon
ST 2024	76-T-MACH-106428	Vehicle Systems for Urban Mobility			Cichon, Berthold

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral examination
Duration: approx. 20 minutes
No tools or reference material may be used during the exam.

T 7.473 Course: Virtual Engineering I [T-MACH-102123]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	3

Events					
WT 23/24	2121352	Virtual Engineering I	2 SWS	Lecture / 🗣	Ovtcharova
WT 23/24	2121353	Exercises Virtual Engineering I	2 SWS	Practice / 🗣	Ovtcharova, Mitarbeiter
Exams					
WT 23/24	76-T-MACH-102123	Virtual Engineering I			Ovtcharova
WT 23/24	76-T-MACH-102123-mdl	Virtual Engineering I			Ovtcharova
ST 2024	76-T-MACH-102123	Virtual Engineering I			Ovtcharova

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Writen examination 90 min.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Virtual Engineering I

2121352, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course includes:

- Conception of the product (system approaches, requirements, definitions, structure)
- Generation of domain-specific product data (CAD, ECAD, software, ...) and AI methods
- Validation of product properties and production processes through simulation
- Digital twin for optimization of products and processes using AI methods

After successful attendance of the course, students can:

- conceptualize complex systems with the methods of virtual engineering and continue the product development in different domains
- model the digital product with regard to planning, design, manufacturing, assembly and maintenance.
- use validation systems to validate product and production in an exemplary manner.
- Describe AI methods along the product creation process.

Literature
Vorlesungsfolien / Lecture slides

V Exercises Virtual Engineering I

2121353, WS 23/24, 2 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

Content
The theoretical Konzepts and contents of the lecture will be trained within practical relevance by basic functionalities of VE System solutions.

Organizational issues
Practice dates will probably be offered on different afternoons (14:00 - 17:15) in two-week intervals at IMI / Übungstermine werden voraussichtlich an unterschiedlichen Nachmittagen (14:00 - 17:15) in zweiwöchigem Rhythmus am IMI angeboten.

Literature
Exercise script / Übungsskript

T 7.474 Course: Virtual Engineering II [T-MACH-102124]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	3

Events					
ST 2024	2122378	Virtual Engineering II	2/1 SWS	Lecture / Practice (/ 🗣	Häfner, Ovtcharova
Exams					
WT 23/24	76-T-MACH-102124	Virtual Engineering II			Ovtcharova, Häfner
WT 23/24	76-T-MACH-102124-mdl	Virtual Engineering II			Ovtcharova, Häfner
ST 2024	76-T-MACH-102124	Virtual Engineering II			Ovtcharova, Häfner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Writen examination 90 min.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Virtual Engineering II

2122378, SS 2024, 2/1 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
The course includes:

- Fundamentals (Computer Graphics, VR, AR, MR)
- Hardware and Software Solutions
- Virtual Twin, Validation and application

After successful attendance of the course, students can:

- describe Virtual Reality concepts, as well as explaining and comparing the underlying technologies
- discuss the modeling and computer-internal picture of a VR scene and explain the operation of the pipeline to visualize the scene
- designate different systems to interact with a VR scene and assess the pros and cons of manipulation and tracking devices
- differentiate between static, dynamic and functional Virtual Twins
- describe applications and validation studies with Virtual Twins in the area of building and production

Organizational issues
Zusätzliche Übungszeiten (1 SWS) werden zu Vorlesungsbegin bekannt gegeben / Additional practice times (1 SWS) will be announced at the beginning of the lecture.

Literature
Vorlesungsfolien / Lecture slides

T 7.475 Course: Virtual Engineering Lab [T-MACH-106740]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	1

Events					
WT 23/24	2123350	Virtual Engineering Lab	3 SWS	Project (P / 🗣	Ovtcharova, Häfner
ST 2024	2123350	Virtual Engineering Lab	3 SWS	Project (P / 🗣	Häfner, Ovtcharova
Exams					
WT 23/24	76-T-MACH-106740	Virtual Engineering Lab			Ovtcharova, Häfner

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Assessment of another type (graded), Group project to create a VR application (project task, implementation and presentation of the project work)

Below you will find excerpts from events related to this course:

V Virtual Engineering Lab

2123350, WS 23/24, 3 SWS, Language: German/English, Open in study portal

Project (PRO)
On-Site

Content

- Introduction in Virtual Reality (hardware, software, applications)
- Exercises in the task specific software systems
- Autonomous project work in the area of Virtual Reality in small groups

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Keine / None

V Virtual Engineering Lab

2123350, SS 2024, 3 SWS, Language: German/English, Open in study portal

Project (PRO)
On-Site

Content

- Introduction in Virtual Reality (hardware, software, applications)
- Exercises in the task specific software systems
- Autonomous project work in the area of Virtual Reality in small groups

Organizational issues
Siehe Webseite zur Lehrveranstaltung / see web page of the lecture

Literature
Keine / None

T 7.476 Course: Virtual Solution Methods and Processes [T-MACH-111285]

Responsible: Dipl.-Ing. Thomas Maier
Prof. Dr.-Ing. Jivka Ovtcharova

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Expansion	Version
Examination of another type	4	Grade to a third	Each term	1 terms	1

Events					
WT 23/24	2121003	Virtual Solution Methods and Processes	4 SWS	Project (P / 🗣	Meyer, Ovtcharova
ST 2024	2121003	Virtual Solution Methods and Processes	4 SWS	Project (P / 🗣	Meyer
Exams					
WT 23/24	76-T-MACH-111285	Virtual Solution Methods and Processes			Meyer, Ovtcharova

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Graded examination performance of another type weighted according to: 30% project documentation, 30% colloquium and 40% successfully completed project task.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Virtual Solution Methods and Processes

2121003, WS 23/24, 4 SWS, Language: German/English, Open in study portal

Project (PRO)
On-Site

Content
Requirements, SysML, Modelica, high performance computing, process modeling, Virtual Twin

Students can:

- Collect requirements for large technical systems (e.b.: Helmholtz large-scale device KATRIN).
- Describe physical systems across domains with the modeling language Modelica and simulate the systems behavior.
- Generate complex FE meshes for simulations of structural mechanics, electrodynamics or fluid mechanics.
- Perform advanced simulations on mainframe computers and prepare and explain results in a self-explanatory manner.
- Individually design a small project and carry it out independently.

V Virtual Solution Methods and Processes

2121003, SS 2024, 4 SWS, Language: German/English, Open in study portal

Project (PRO)
On-Site

Content
Requirements, SysML, Modelica, high performance computing, process modeling, Virtual Twin

Students can:

- Collect requirements for large technical systems (e.b.: Helmholtz large-scale device KATRIN).
- Describe physical systems across domains with the modeling language Modelica and simulate the systems behavior.
- Generate complex FE meshes for simulations of structural mechanics, electrodynamics or fluid mechanics.
- Perform advanced simulations on mainframe computers and prepare and explain results in a self-explanatory manner.
- Individually design a small project and carry it out independently.

T 7.477 Course: Virtual Training Factory 4.X [T-MACH-106741]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each term	2

Events					
WT 23/24	2123351	Virtual training factory 4.X		/ 🗣	Ovtcharova, Mitarbeiter
Exams					
WT 23/24	7600036	Virtual Training Factory 4.X			Häfner

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Assessment of another type (graded), Group project (project work, final presentation) for the modeling of production plants in VR

Prerequisites
none

Below you will find excerpts from events related to this course:

V Virtual training factory 4.X

2123351, WS 23/24, SWS, Language: German, Open in study portal **On-Site**

Content
In interdisciplinary teams, the creation of a product is implemented in the style of a start-up. The event is carried out across universities in cooperation with the HsKA.

Organizational issues
Siehe ILIAS zur Lehrveranstaltung

Literature
Keine / None

T 7.478 Course: Warehousing and Distribution Systems [T-MACH-105174]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each summer term	2

Events					
ST 2024	2118097	Warehousing and distribution systems	2 SWS	Lecture / 🗣	Furmans
Exams					
ST 2024	76-T-MACH-105174	Warehousing and Distribution Systems			Furmans

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4 (2), 2 SPO) may also be offered.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Warehousing and distribution systems

2118097, SS 2024, 2 SWS, Language: German, Open in study portal

Lecture (V)
On-Site

Organizational issues
Die Vorlesung wird in diesem Semester als **Blockveranstaltung** angeboten. Die Veranstaltungstermine sind:

- Mi., 24. April
- Do., 25. April
- Fr., 26. April

Die Vorlesung startet jeweils um 08:00 Uhr und findet im **Selmayr-HS (Geb. 50.38)** statt. Bitte beachten Sie für mögliche kurzfristige Raumänderungen die Informationen im ILIAS-Kurs.

Literature

ARNOLD, Dieter, FURMANS, Kai (2005)
Materialfluss in Logistiksystemen, 5. Auflage, Berlin: Springer-Verlag

ARNOLD, Dieter (Hrsg.) et al. (2008)
Handbuch Logistik, 3. Auflage, Berlin: Springer-Verlag

BARTHOLDI III, John J., HACKMAN, Steven T. (2008)
Warehouse Science

GUDEHUS, Timm (2005)
Logistik, 3. Auflage, Berlin: Springer-Verlag

FRAZELLE, Edward (2002)
World-class warehousing and material handling, McGraw-Hill

MARTIN, Heinrich (1999)
Praxiswissen Materialflußplanung: Transport, Hanshaben, Lagern, Kommissionieren, Braunschweig, Wiesbaden: Vieweg

WISSER, Jens (2009)
Der Prozess Lagern und Kommissionieren im Rahmen des Distribution Center Reference Model (DCRM); Karlsruhe : Universitätsverlag

Eine ausführliche Übersicht wissenschaftlicher Paper findet sich bei:

ROODBERGEN, Kees Jan (2007)
Warehouse Literature

T 7.479 Course: Water Quality Assessment [T-CIWVT-108841]

Responsible: Dr. Gudrun Abbt-Braun
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 23/24	2233210	Scientific Principles for Water Quality Assessment	2 SWS	Lecture / 🗣	Abbt-Braun
WT 23/24	2233211	Excercises and Demonstration for 2233210 Scientific Principles for Water Quality Assessment	1 SWS	Practice / 🗣	Abbt-Braun, Horn, und Mitarbeiter
Exams					
WT 23/24	7232603	Water Quality Assessment			Abbt-Braun
ST 2024	7232603	Water Quality Assessment			Abbt-Braun

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The examination is an oral examination with a duration of about 30 minutes (section 4 subsection 2 number 2 SPO).

Prerequisites
None

T 7.480 Course: Water Technology [T-CIWVT-106802]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101121 - Water Chemistry and Water Technology I

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	1

Events					
WT 23/24	2233030	Water Technology	2 SWS	Lecture / 🗣	Horn
WT 23/24	2233031	Exercises to Water Technology	1 SWS	Practice / 🗣	Horn, und Mitarbeiter
Exams					
WT 23/24	7232621	Water Technology			Horn
ST 2024	7232621	Water Technology			Horn

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 7.481 Course: Web App Programming for Finance [T-WIWI-110933]

Responsible: TT-Prof. Dr. Julian Thimme
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3

Type	Credits	Grading scale	Recurrence	Version
Written examination	4,5	Grade to a third	Once	1

Competence Certificate
Non exam assessment according to § 4 paragraph 3 of the examination regulation. (Anmerkung: gilt nur für SPO 2015). The grade is made up as follows: 50% result of the project (R-code), 50% presentation of the project.

Prerequisites
None

Recommendation
The content of the bachelor course Investments is assumed to be known and necessary to follow the course.

T 7.482 Course: Welding Technology [T-MACH-105170]

Responsible: Dr. Majid Farajian
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 23/24	2173571	Welding Technology	2 SWS	Block / 🗣	Farajian
Exams					
WT 23/24	76-T-MACH-105170	Welding Technology			Farajian

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, about 20 minutes

Prerequisites
none

Recommendation
Basics of material science (iron- and non-iron alloys), materials, processes and production, design.

All the relevant books of the German Welding Institute (DVS: Deutscher Verband für Schweißen und verwandte Verfahren) in the field of welding and joining is recommended.

Below you will find excerpts from events related to this course:

V **Welding Technology** **Block (B)**
2173571, WS 23/24, 2 SWS, Language: German, Open in study portal **On-Site**

Content
definition, application and differentiation: welding,

welding processes, alternative connecting technologies.

history of welding technology

sources of energy for welding processes

Survey: Fusion welding,

pressure welding.

weld seam preparation/design

welding positions

weldability

gas welding, thermal cutting, manual metal-arc welding

submerged arc welding

gas-shielded metal-arc welding, friction stir welding, laser beam and electron beam welding, other fusion and pressure welding processes

static and cyclic behavior of welded joints,

fatigue life improvement techniques

learning objectives:

The students have knowledge and understanding of the most important welding processes and its industrial application.

They are able to recognize, understand and handle problems occurring during the application of different welding processes relating to design, material and production.

They know the classification and the importance of welding technology within the scope of connecting processes (advantages/ disadvantages, alternatives).

The students will understand the influence of weld quality on the performance and behavior of welded joints under static and cyclic load.

How the fatigue life of welded joints could be increased, will be part of the course.

requirements:
basics of material science (iron- and non-iron alloys), of electrical engineering, of production processes.

workload:

The workload for the lecture Welding Technology is 120 h per semester and consists of the presence during the lecture (18 h) as well as preparation and rework time at home (102 h).

exam:

oral, ca. 20 minutes, no auxiliary material

Organizational issues
Blockveranstaltung im Januar und Februar. Zur Teilnahme an der Vorlesung ist eine Anmeldung beim Dozenten per E-Mail an Farajian@slv-duisburg.de erforderlich. Vorlesungstermine und Hörsaal werden den angemeldeten Teilnehmern Anfang des Jahres mitgeteilt.

Literature
Für ergänzende, vertiefende Studien gibt das

Handbuch der Schweißtechnik von J. Ruge, Springer Verlag Berlin, mit seinen vier Bänden

Band I: Werkstoffe

Band II: Verfahren und Fertigung

Band III: Konstruktive Gestaltung der Bauteile

Band IV: Berechnung der Verbindungen

einen umfassenden Überblick. Der Stoff der Vorlesung Schweißtechnik findet sich in den Bänden I und II. Einen kompakten Einblick in die Lichtbogenschweißverfahren bietet das Bändchen

Nies: Lichtbogenschweißtechnik, Bibliothek der Technik Band 57, Verlag moderne Industrie AG und Co., Landsberg / Lech

Im Übrigen sei auf die zahlreichen Fachbücher des DVS Verlages, Düsseldorf, zu allen Einzelgebieten der Fügetechnik verwiesen.

T 7.483 Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 23/24	2577922	Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)	2 SWS	Seminar / 🗣	Lindstädt
Exams					
WT 23/24	7900172	Workshop Business Wargaming – Analyzing Strategic Interactions			Lindstädt

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

Below you will find excerpts from events related to this course:

V Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)

2577922, WS 23/24, 2 SWS, Language: German, Open in study portal

Seminar (S)
On-Site

Content
This course enables the simulation of strategic conflicts in which the participants assume the roles of selected actors. With the help of specially programmed wargaming software, strategic conflicts are simulated interactively and then reflected upon and discussed.

The course focuses on the simulation and analysis of real conflict situations with strategic interaction. Students gain a better understanding of the structural characteristics of strategic conflicts in the fields of economics and politics as well as the ability to derive their own strategies for action.

Through a combination of group work, simulation, and reflection, the seminar provides a learning experience that both strengthens team skills and develops analytical skills in strategic conflict. Join this seminar to gain sound insights into conflict dynamics and develop effective action strategies for complex situations.

Learning Objectives

Upon completion of the course, students will be able to,

- learn the basic methodologies, features and benefits of business wargaming
- improve their understanding of conflict dynamics by reflecting on strategic conflicts
- Strengthen analytical skills by processing a variety of courses of action and deriving strategies for action

Recommendations:

Prior attendance of the Bachelor's module "Strategy and Organization" or another module with comparable content at another university is recommended.

Workload:

- Total workload: approx. 90 hours
- Attendance time: 15 hours
- Preparation and follow-up: 75 hours
- Examination and preparation: not applicable

Evidence:

In this course, real conflict situations are simulated and analyzed with the help of various methods from business wargaming. Details on the design of the performance review will be announced during the lecture.

Annotation:

The course is admission restricted. In case of prior admission to another course in the module "Strategy and Management: Advanced Topics" [M-WIWI-103119], participation in this course is guaranteed. For more information on the application process, see the IBU website.

Exams are offered at least every other semester, so the entire module can be completed in two semesters.

T 7.484 Course: Workshop Current Topics in Strategy and Management [T-WIWI-106188]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Advanced Topics in Strategy and Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	3	Grade to a third	Irregular	1

Events					
WT 23/24	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar / 🗣	Lindstädt
ST 2024	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar / 🗣	Lindstädt
Exams					
WT 23/24	7900171	Workshop Current Topics in Strategy and Management			Lindstädt

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The evaluation of the performance takes place through the active participation in the discussion rounds; an appropriate preparation is expressed here and a clear understanding of the topic and framework becomes recognizable. Further details on the design of the performance review will be announced during the lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V **Workshop aktuelle Themen Strategie und Management (Master)** **Seminar (S) On-Site**
2577923, WS 23/24, 2 SWS, Language: German, Open in study portal

Content
Aspects of strategic management can be found in a variety of daily events. In this course, current strategic and industrial policy issues are discussed and the exchange of ideas on current management topics is promoted.

For this purpose, practice-relevant case studies and dedicated questions are communicated to the students in advance so that they can prepare themselves individually for the discussion. The chair team actively moderates the discussion and creates typical discussion situations such as pro/con discussions and conflicting interests of different groups in order to bring opposing opinions into an exchange and to promote the power of argumentation. In this way, the discussion not only imparts knowledge about the content, but also strengthens the participants' skills by simulating real discussion situations in a management team.

In addition, company representatives and managers participate in individual case studies to strengthen the context of the content and experience the daily dynamics of discussion in strategic business areas.

Learning Objectives:

Students will

- are able to evaluate strategic decisions using appropriate models of strategic business management,
- are able to present and critically evaluate theoretical approaches and models in the field of strategic business management and illustrate them using practical examples, and
- have the ability to present their position convincingly through a reasoned argumentation in structured discussions.

Recommendations:

Previous attendance of the Bachelor's module "Strategy and Organization" or another module with comparable content at another university is recommended.

Workload:

Total effort approx. 90 hours

Attendance time: 15 hours

Preparation and follow-up: 75 hours

Examination and preparation: not applicable

Evidence:

Performance will be assessed through active discussion participation in the discussion rounds; here, adequate preparation will be expressed and a clear understanding of the topic and framework will be evident. Further details on the design of the performance assessment will be announced during the lecture.

Annotation:

This course is admission restricted. In case of prior admission to another course in the module "Strategy and Management: Advanced Topics"[M-WIWI-103119], participation in this course is guaranteed. For more information on the application process, see the IBU website.

Exams are offered at least every other semester so that the entire module can be completed in two semesters.

V **Workshop aktuelle Themen Strategie und Management (Master)** **Seminar (S)**
2577923, SS 2024, 2 SWS, Language: German, Open in study portal **On-Site**

Content
Aspects of strategic management can be found in a variety of daily events. In this course, current strategic and industrial policy issues are discussed and the exchange of ideas on current management topics is promoted.

For this purpose, practice-relevant case studies and dedicated questions are communicated to the students in advance so that they can prepare themselves individually for the discussion. The chair team actively moderates the discussion and creates typical discussion situations such as pro/con discussions and conflicting interests of different groups in order to bring opposing opinions into an exchange and to promote the power of argumentation. In this way, the discussion not only imparts knowledge about the content, but also strengthens the participants' skills by simulating real discussion situations in a management team.

In addition, company representatives and managers participate in individual case studies to strengthen the context of the content and experience the daily dynamics of discussion in strategic business areas.

Learning Objectives:

Students will

- are able to evaluate strategic decisions using appropriate models of strategic business management,
- are able to present and critically evaluate theoretical approaches and models in the field of strategic business management and illustrate them using practical examples, and
- have the ability to present their position convincingly through a reasoned argumentation in structured discussions.

Recommendations:

Previous attendance of the Bachelor's module "Strategy and Organization" or another module with comparable content at another university is recommended.

Workload:

Total effort approx. 90 hours

Attendance time: 15 hours

Preparation and follow-up: 75 hours

Examination and preparation: not applicable

Evidence:

Performance will be assessed through active discussion participation in the discussion rounds; here, adequate preparation will be expressed and a clear understanding of the topic and framework will be evident. Further details on the design of the performance assessment will be announced during the lecture.

Annotation:

This course is admission restricted. In case of prior admission to another course in the module "Strategy and Management: Advanced Topics"[M-WIWI-103119], participation in this course is guaranteed. For more information on the application process, see the IBU website.

Exams are offered at least every other semester so that the entire module can be completed in two semesters.

T 7.485 Course: X-ray Optics [T-MACH-109122]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each term	1

Events					
WT 23/24	2141007	X-ray Optics	2 SWS	Lecture / 🗣	Last
ST 2024	2141007	X-ray optics	2 SWS	Lecture / 🗣	Last
Exams					
WT 23/24	76-T-MACH-109122	X-ray Optics			Last

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral exam (about 20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V X-ray Optics

2141007, WS 23/24, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Organizational issues
Termin und Ort nach Absprache mit den Angemeldeten

Literature
M. Born und E. Wolf
Principles of Optics, 7th (expanded) edition
Cambridge University Press, 2010

A. Erko, M. Idir, T. Krist und A. G. Michette
Modern Developments in X-Ray and Neutron Optics
Springer Series in Optical Sciences, Vol. 137
Springer-Verlag Berlin Heidelberg, 2008

D. Attwood
Soft X-Rays and Extreme Ultraviolet Radiation: Principles and Applications
Cambridge University Press, 1999

V X-ray optics

2141007, SS 2024, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
see Institute homepage

If you are interested, please contact arndt.last@kit.edu by 30.5.2023 to make an appointment.

Organizational issues
Viertägiger Blockkurs im Juni oder Juli 2024. Interessenten melden sich bitte zur Terminabsprache bis zum 30.5.2024 bei arndt.last@kit.edu