Karlsruher Institut für Technologie

Module Handbook
Industrial Engineering and Management M.Sc.

SPO 2015

Summer term 2020

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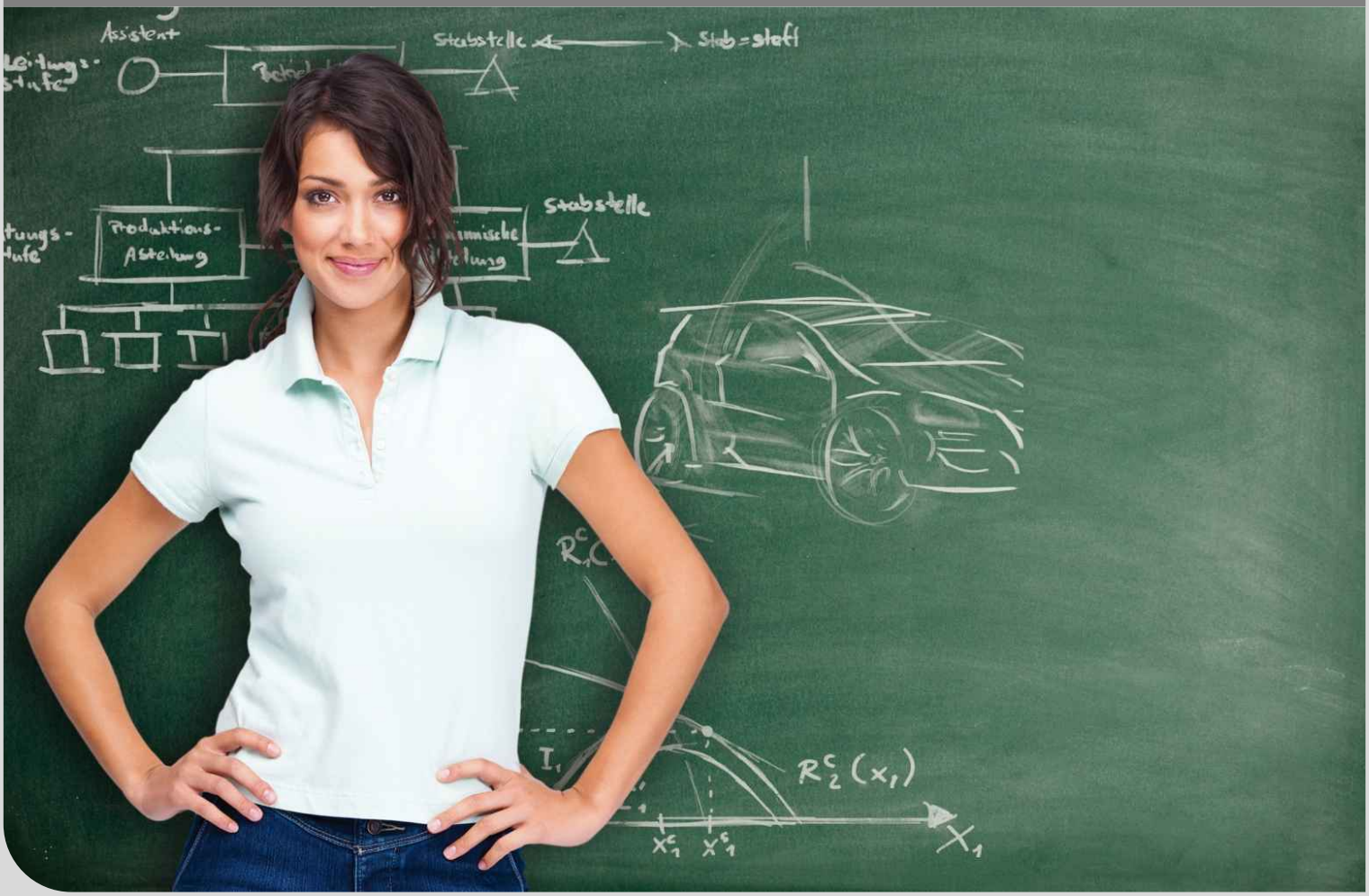
KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT



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1 Welcome to the new module handbook of your study programme

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!

The following contact persons are at your disposal for questions and problems at any time.

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Write to us!

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2 About this handbook

2.1 Notes and rules

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).

2.1.1 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.

2.1.2 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.

2.1.3 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, https://studium.kit.edu/Seiten/FAQ.aspx.

2.1.4 Types of exams

Exams are split into written exams, oral exams and alternative exam assessments. Exams are always graded. Non exam assessments can be repeated several times and are not graded.

2.1.5 Repeating exams

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. A counseling interview is mandatory.

For further information see http://www.wiwi.kit.edu/hinweiseZweitwdh.php.

2.1.6 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.

2.1.7 Allocation of places for courses with a limited number of participants

The allocation of places in courses with a limited number of participants will be based on preferences and suitability for the topics. Among other things, professional and practical experience in the subject area as well as foreign language skills, if applicable, play a role. Students with the highest academic progress will be given preferential admission. Places are usually allocated via the WIWI portal at https://portal.wiwi.kit.edu/.

2.1.8 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.

2.1.9 Further information

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).

2.2 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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Anabela Relvas
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E-Mail: pruefungssekretariat@wiwi.kit.edu

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3 Why Industrial Engineering and Management?

The Industrial Engineering and Management study programme is attractive for you if you want to pursue economic and technical interests during your studies. There are three main reasons why graduates have huge job opportunities:

That speaks (among other things) for the course of studies:

- Germany is a high-tech country that depends on innovation. Anyone who wants to take on responsibility in a company here benefits from an interdisciplinary course of study in economics and technology.
- In the digital society, the distinction between technical and business issues is becoming blurred. Industrial engineers understand both and can therefore assume important interface functions.
- Data and data-based decisions are becoming increasingly important in companies and research. The Industrial Engineering and Management study programme has a strong quantitative-methodological orientation and thus prepares students perfectly for these tasks.

You can find more information about the program here:

https://ranking.zeit.de/che/de/fachinfo/13
http://www.tu9.de/studium/2982.php

Why Industrial Engineering and Management at KIT? There are some universities in Germany where you can study Industrial Engineering and Management very well. In comparison, studying with us has three important advantages:

- **Flexibility** If you are study Industrial Engineering and Management at KIT, you can tailor your course content to suit your individual needs. At the beginning of your studies, you do not yet decide on a technical subject. First of all, our compulsory courses in the basic programme offer you a broad overview. In the subsequent specialisation programme, you can choose the course content in the technical subjects and economics according to your own interests and goals. Link to the module manual
- **High Informatics share** Digitisation permeates all sectors of the economy and technology. For this reason, Informatics content is particularly anchored in both our basic and advanced programs. As a graduate, you can play an active role in the digital transformation of business and society.
- **Our own faculty** The Industrial Engineering and Management study programme is the core course of studies at the KIT department of Economics. The courses in economics and Informatics are designed for your course of studies and aligned to your interests.

What else speaks for an Industrial Engineering and Management study programme at KIT? These three advantages make the Industrial Engineering and Management study programme at KIT unique. In addition, there are a number of other reasons for studying with us:

- **Top positions in rankings**. In surveys of students and HR managers at companies, our degree programme regularly scores very well.
- **Job opportunities**. After completing their studies with us, students usually quickly find a job that they like.
- **Found your own business**. At KIT you will find an ideal environment for starting your own business. Information on start-up activities at KIT can be found at http://kit-gruenderschmiede.de/de/gruenderschmiede/fuer-studierende/
- **Student activities**. At our faculty and at the KIT, students are committed to themselves and others in a variety of ways. You can find an overview under Student Life at the Department, for example.
- **Sports Offer**. At KIT you will find a wide range of sports activities. Examples are the KIT SC (kitsc.de/ External Link) and the University Sports Programme (www.sport.kit.edu/hochschulsport/ External Link). Campus University. The KIT has a large campus directly in the city centre of Karlsruhe.

4 The Master's degree program in Industrial Engineering and Management

4.1 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).

4.2 Structure of the Master's degree program in Industrial Engineering and Management (M.Sc.) SPO 2015

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 rowspan="2">Seminar Module
9 CP</td><td rowspan="3"></td></tr>
<tr><td>2</td><td>29</td></tr>
<tr><td>3</td><td>32</td><td>BUS
9 CP</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">ENG
9 CP</td><td rowspan="2">Elect. Module 1
9 CP

Elect. Module 2
9 CP</td></tr>
<tr><td>4</td><td>30</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.

4.3 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 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 Thesis

Credits
30

Mandatory		
M-WIWI-101650	Module Master Thesis	30 CR

5.2 Business Administration

Credits
18

Election block: Business Administration (2 items)		
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-101470	Data Science: Advanced CRM	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-105032	Data Science for Finance	9 CR
M-WIWI-104080	Designing Interactive Information Systems	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-105036	FinTech Innovations	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 neu	9 CR
M-WIWI-101446	Market Engineering	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

5.3 Economics

Credits
9

Election block: Economics (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 neu	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

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

5.5 Operations Research

Credits
9

Election block: Operations Research (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

Election block: Engineering Sciences (2 items)		
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-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-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-BGU-101884	Lean Management in Construction	9 CR
M-MACH-105298	Logistics and Supply Chain Management neu	9 CR
M-MACH-101277	Material Flow in Logistic Systems	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-101294	Nanotechnology	9 CR
M-WIWI-104837	Natural Hazards and Risk Management	9 CR
M-MACH-101295	Optoelectronics and Optical Communication	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-ETIT-101159	Sensor Technology II	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-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-MACH-101284	Specialization in Production Engineering	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 two elective modules. Both elective modules can be chosen from Business Administration, Economics, Informatics, Operations Research, Engineering Sciences, Statistics, Law or Sociology. In principle, both 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
Election block: Business Administration (at most 18 credits)		
M-WIWI-101410	Business & Service Engineering	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101510	Cross-Functional Management Accounting	9 CR
M-WIWI-101470	Data Science: Advanced CRM	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-105032	Data Science for Finance	9 CR
M-WIWI-104080	Designing Interactive Information Systems	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-105036	FinTech Innovations	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-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
Election block: Economics (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
Election block: Informatics (at most 18 credits)		
M-WIWI-101628	Emphasis in Informatics	9 CR
M-WIWI-101630	Electives in Informatics	9 CR
Election block: Operations Research (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
Election block: Engineering Sciences (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-MACH-101296	Energy and Process Technology I	9 CR
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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
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M-MACH-101268	Specific Topics in Materials Science	9 CR
M-BGU-100999	Highway Engineering	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-MACH-101284	Specialization in Production Engineering	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
Election block: Statistics (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
Election block: Law or Sociology (at most 9 credits)		
M-INFO-101242	Governance, Risk & Compliance	9 CR
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 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Election block: Specialization module logistics ()			
T-MACH-105174	Warehousing and Distribution Systems	3 CR	Furmans
T-MACH-105175	Airport Logistics	3 CR	Richter
T-MACH-105159	Global Production and Logistics - Part 2: 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-105171	Safety Engineering	4 CR	Kany
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Braun, Schönung
T-MACH-102159	Elements and Systems of Technical Logistics	4 CR	Fischer, Mittwollen
T-MACH-108946	Elements and Systems of Technical Logistics - Project	2 CR	Fischer, Mittwollen
T-MACH-102160	Selected Applications of Technical Logistics	4 CR	Milushev, Mittwollen
T-MACH-108945	Selected Applications of Technical Logistics - Project	2 CR	Milushev, Mittwollen
T-MACH-105230	Decentrally Controlled Intralogistic Systems	4 CR	Furmans, Hochstein
T-MACH-106693	Plug-and-play Material Handling	4 CR	Dziedzitz, Furmans

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 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.

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

Workload
270 hours

Learning type
Lecture, tutorial.

M 6.2 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	4

Mandatory			
T-WIWI-102740	Public Management	4,5 CR	Wigger
Election block: Supplementary Courses (between 4,5 and 5 credits)			
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, 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.

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.

Prerequisites
The course "Public Management" is compulsory and must be examined.

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.

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

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.

M 6.3 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	Recurrence	Language	Level	Version
9	Each term	German	4	1

Election block: Compulsory Elective Courses (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 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.

Competence Goal
Students

- are able to analyze business strategies and derive recommendations using appropriate frameworks
- learn to express their position through compelling reasoning in structured discussions
- are qualified to critically examine recent research topics in the field of strategic management
- can derive own conclusions from less structured information by using interdisciplinary knowledge

Prerequisites
None

Content
The module is divided into three main topics:

The students

- analyze and discuss a wide range of business strategies on the basis of collectively selected case studies.
- participate in a business wargaming workshop and analyze strategic interactions.
- write a paper about current topics in the field of strategic management theory.

Recommendation
None

Annotation
This course is admission restricted. After being admitted to one course of this module, the participation at the other courses will be guaranteed.

Every course of this module will be at least offered every second term. Thus, it will be possible to complete the module within two terms.

M 6.4 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	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	2

Election block: Compulsory Elective Courses (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-102840	Innovation Theory and Policy	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.

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

Prerequisites
None

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.

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

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

M 6.5 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Mandatory			
T-WIWI-103123	Advanced Statistics	4,5 CR	Grothe
Election block: Supplementary Courses (between 4,5 and 5 credits)			
T-WIWI-106341	Machine Learning 2 – Advanced Methods	4,5 CR	Zöllner
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe

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.

Prerequisites
The course "*Advanced Statistics*" is compulsory.

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 6.6 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	4

Mandatory			
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß
Election block: Supplementary Courses (between 45 and 5 credits)			
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-102640	Market Engineering: Information in Institutions	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.

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.

Prerequisites
The course "Advanced Game Theory" is obligatory. Exception: The course "Introduction to Game Theory" was completed.

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.

Recommendation
Basic knowledge in game theory is assumed.

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.

M 6.7 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	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German	4	1

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

Competence Certificate
written exam (120 minutes)

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.

Prerequisites
none

Content
The lecture provides an overview of the structure and functioning of automated manufacturing systems. In the introduction chapter the basic elements for the realization of automated manufacturing systems are given. This includes:

- Drive and control technology
- Handling technology for handling work pieces and tools
- Industrial Robotics
- Quality assurance in automated manufacturing
- automatic machines, cells, centers and systems for manufacturing and assembly
- structures of multi-machine systems
- planning of automated manufacturing systems

In the second part of the lecture, the basics are illustrated using implemented manufacturing processes for the production of automotive components (chassis and drive technology).The analysis of automated manufacturing systems for manufacturing of defined components is also included. In the field of vehicle power train both, the automated manufacturing process for the production of the conventional internal-combustion engine and the automated manufacturing process for the production of the prospective electric power train (electric motor and battery) are considered. In the field of car body, the focus is on the analysis of the process chain for the automated manufacturing of conventional sheet metal body parts, as well as for automated manufacturing of body components made out of fiber-reinforced plastics. Within tutorials, the contents from the lecture are advanced and applied to specific problems and tasks.

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

Learning type
Lectures, exercise, excursion

M 6.8 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	4

Election block: Automotive Engineering (at least 9 credits)			
T-MACH-100092	Automotive Engineering I	6 CR	Gauterin, Unrau
T-MACH-102117	Automotive Engineering II	3 CR	Gauterin, Unrau
T-MACH-102156	Project Workshop: Automotive Engineering	4,5 CR	Frey, 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-102093	Fluid Power Systems	5 CR	Geimer, Pult
T-MACH-102150	BUS-Controls	3 CR	Becker, Geimer
T-MACH-108889	BUS-Controls - Advance	0 CR	Daiß, Geimer
T-MACH-102203	Automotive Engineering I	6 CR	Gauterin, Gießler
T-MACH-110796	Python Algorithm for Vehicle Technology	4 CR	Rhode

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).

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.

Prerequisites
None

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.

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

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.

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

M 6.9 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Mandatory			
T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	3 CR	Guber
Election block: BioMEMS (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-102172	Bionics for Engineers and Natural Scientists	3 CR	Hölscher
T-MACH-102176	Current Topics on BioMEMS	4 CR	Guber

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 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

Prerequisites
none

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

M 6.10 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	4

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-102848	Personalization and Services	4,5 CR	Sonnenbichler
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-WIWI-102641	Service Innovation	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 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 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

Prerequisites
None

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.

Recommendation
None

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 6.11 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	English	4	4

Election block: Compulsory Elective Courses ()			
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.

Competence Goal
Students

- are able to model practical problems of the public sector and to analyze them with respect to positive and normative questions,
- 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.

Prerequisites
None

Content
The focus of the module is on mechanisms of public decisions 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 6.12 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	Recurrence	Duration	Level	Version
9	Each winter term	1 semester	4	4

Election block: Wahlpflicht (between 1 and 2 items)			
T-MACH-102194	Combustion Engines I	5 CR	Koch, Kubach
T-MACH-105564	Energy Conversion and Increased Efficiency in Internal Combustion Engines	4 CR	Koch, Kubach

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

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.

Prerequisites
None

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

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

M 6.13 Module: Combustion Engines II [M-MACH-101303]

Responsible: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

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

Credits	Recurrence	Level	Version
9	Each term	4	2

Mandatory			
T-MACH-104609	Combustion Engines II	5 CR	Koch, Kubach
Election block: Verbrennungsmotoren II (at least 4 credits)			
T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment	4 CR	Deutschmann, Grunwaldt, Kubach, Lox
T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	4 CR	Gohl
T-MACH-105184	Fuels and Lubricants for Combustion Engines	4 CR	Kehrwald, Kubach
T-MACH-105167	Analysis Tools for Combustion Diagnostics	4 CR	Pfeil
T-MACH-102197	Gas Engines	4 CR	Golloch, Kubach
T-MACH-102199	Model Based Application Methods	4 CR	Kirschbaum
T-MACH-105169	Engine Measurement Techniques	4 CR	Bernhardt

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.

Competence Goal
See courses.

Prerequisites
None

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

M 6.14 Module: Commercial Law [M-INFO-101191]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	3

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

M 6.15 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	Recurrence	Level	Version
9	Each term	4	2

Mandatory			
T-ETIT-100981	Automation of Discrete Event and Hybrid Systems	3 CR	Hohmann
T-ETIT-100666	Control of Linear Multivariable Systems	6 CR	Hohmann

Competence Certificate
The assessment is carried out as partial written exams of the single courses of this module (T-ETIT-100981 and T-ETIT-100666).

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

- have deeper knowledge in the field of control theory and system dynamics,
- are able to analyze multivariable systems in state space and frequency domain and are familiar with adequate methods for the control design,
- know the basics of modelling, simulation, analyses and control of discrete-event and hybrid systems.

Prerequisites
none

Content
This module broadens the basic knowledge of system dynamics of the students to the multivariable case. Both I/O-models in frequency domain and mainly state space models are regarded, for which several methods for the analysis and the control design with different goals (decoupling, robustness) and constraints (disturbances, sensor failures) are presented. Above that, the basics of modelling, simulation, analysis and control of discrete-event and hybrid systems are discussed.

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* (2303155) which is recommended to have been attended beforehand.

Workload
See German version.

M 6.16 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	8

Mandatory			
T-WIWI-102885	Advanced Management Accounting	4,5 CR	Wouters
Election block: Supplementary Courses (4,5 credits)			
T-WIWI-110179	Advanced Management Accounting 2	4,5 CR	Wouters
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
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-102883	Pricing	4,5 CR	Feurer
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.

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

Prerequisites
The course "Advanced Management Accounting" is compulsory.

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

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.

Recommendation
None

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.

M 6.17 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	Recurrence	Language	Level	Version
9	Each winter term	English	4	1

Mandatory			
T-WIWI-102878	Computational Risk and Asset Management	6 CR	Ulrich
T-WIWI-110213	Python for Computational Risk and Asset Management	3 CR	Ulrich

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 and 3 of the examination regulation) of the single courses of this module.
The assessment of "Computational Risk and Asset Management" is carried out in form of a written exam (90 minutes), the assessment of "Python for Computational Risk and Asset Management" is carried out in form of twelve weekly Python programming tasks and offered each winter term.
The overall grade of the module is the grade of the written exam weighted with factor 0.75 and the grade for the Python programming tasks weighted with factor 0.25. The resulting grade is truncated after the first decimal.

Competence Goal
Students learn how to implement solutions for advanced and real-world challenges in portfolio management. The focus of this module is on the realization of statistical concepts in Python and enable students to solve a broad range of problems along the investment process on their own.

Content
The module covers several topics, among them:

- Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization
- Return Densities: Forecasting with Traditional and Machine Learning Approaches, Monte Carlo Simulation
- Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor
- Multi-Asset Valuation: DCF Approach, No-Arbitrage and Ito Calculus

Recommendation
Good knowledge of statistics and first programming experience with Python is recommended.

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 6.18 Module: Data Science: Advanced CRM [M-WIWI-101470]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	5

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-109921	Advanced Machine Learning	4,5 CR	Geyer-Schulz, Nazemi
T-WIWI-102762	Business Dynamics	4,5 CR	Geyer-Schulz
T-WIWI-110915	Intelligent Agents and Decision Theory	4,5 CR	Geyer-Schulz
T-WIWI-103549	Intelligent CRM Architectures	4,5 CR	Geyer-Schulz
T-WIWI-102848	Personalization and Services	4,5 CR	Sonnenbichler
T-WIWI-102847	Recommender Systems	4,5 CR	Geyer-Schulz
T-WIWI-105778	Service Analytics A	4,5 CR	Fromm

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.

Competence Goal
The student

- understand service competition as a sustainable competitive strategy and understand the effects of service competition on the design of markets, products, processes and services,
- models, analyzes and optimizes the structure and dynamics of complex business applications,
- develops and realizes personalized services, especially in the field of recommendation services,
- analyzes social networks and knows their application field in CRM,
- works in teams.

Prerequisites
None

Content
Building on the basics of CRM from the Bachelor's degree program, the module "Data Science: Advanced CRM" is focusing on the use of information technology and its related economic issues in the CRM environment.The course "Intelligent CRM Architectures" deals with the design of modern intelligent systems. The focus is on the software architecture and design patterns that are relevant to learning systems. It also covers important aspects of machine learning that complete the picture of an intelligent system. Examples of presented systems are "Taste Map"-architectures, "Counting Services", as well as architectures of "Business Games".The impact of management decisions in complex systems are considered in the course "Business dynamics". The understanding, modeling and simulation of complex systems allows the analysis, the goal-oriented design and the optimization of markets, business processes and regulations throughout the company.Specific problems of intelligent systems are covered in the courses "Personalization and Services", "Recommender Systems", "Service Analytics" and "Social Network Analysis in CRM". The content includes procedures and methods to create user-oriented services. The measurement and monitoring of service systems, the design of personalized offers, and the generation of recommendations based on the collected data of products and customers are discussed. The importance of user modeling and -recognition, data security and privacy are adressed as well.

Recommendation
None

Annotation
The module has been renamed to "Data Science: Advanced CRM" in winter term 2016/2017.

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

M 6.19 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	7

Election block: Compulsory Elective Courses ()			
T-WIWI-108715	Artificial Intelligence in Service Systems	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, Nadj, Toreini
T-WIWI-110918	Introduction to Bayesian Statistics for Analyzing Data	3 CR	Scheibehenne
T-WIWI-106207	Practical Seminar: Data-Driven Information Systems	4,5 CR	Mädche, Satzger, Setzer, 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.

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.

Prerequisites
None.

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

Annotation
The course „Business Data Strategy“ can be chosen from winter term 2016 on.

M 6.20 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	4

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-109863	Business Data Analytics: Application and Tools	4,5 CR	Weinhardt
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, 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.

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

Prerequisites
None

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 6.21 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	Recurrence	Language	Level	Version
9	Each term	German	4	5

Election block: Compulsory Elective Courses (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 rst decimal.

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

Prerequisites
Keine.

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.

Recommendation
None

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

M 6.22 Module: Design, Construction, Operation and Maintenance of Highways [M-BGU-100998]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German	4	2

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

Competence Goal
See German version.

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

Recommendation
None

Annotation
None

Workload
See German version.

M 6.23 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	2

Mandatory			
T-WIWI-110851	Designing Interactive Systems	4,5 CR	Mädche, Morana
Election block: Supplementary Courses (at most 4,5 credits)			
T-WIWI-110877	Engineering Interactive Systems	4,5 CR	
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	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.

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

Prerequisites
The course “Interactive Information Systems” is compulsory and must be examined.

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 6.24 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	Recurrence	Language	Level	Version
9	Each term	German	4	5

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-102822	Industrial Services	4,5 CR	Fromm
T-WIWI-107043	Liberalised Power Markets	3 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

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.

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

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.

Recommendation
None

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.

M 6.25 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	Recurrence	Language	Level	Version
9	Each term	German	4	4

Mandatory			
T-WIWI-103125	Applied Econometrics	4,5 CR	Schienle
Election block: Supplementary Courses (between 4,5 and 5 credits)			
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
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-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller

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
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.

Prerequisites
The course "*Advanced Statistics*" [2520020] is compulsory and must be examined.

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 6.26 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	Recurrence	Language	Level	Version
9	Each term	German	4	3

Election block: Compulsory Elective Courses (between 9 and 10 credits)			
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
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-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-103129	Stochastic Calculus and Finance	4,5 CR	Safarian

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
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.

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

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 6.27 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	4

Election block: Compulsory Elective Courses (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
Election block: Supplementary Courses (1 item)			
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
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.

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

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

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 6.28 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	Recurrence	Language	Level	Version
9	Each term	German	4	1

Election block: Compulsory Elective Courses (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

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.

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.

Prerequisites
None.

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

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. York Sure-Vetter
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Informatics)

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	11

Election block: Compulsory Elective Area ()			
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-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
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-102668	Enterprise Architecture Management	4,5 CR	Wolf
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-110863	Introduction to Data Science	4,5 CR	Herbold
T-WIWI-102666	Knowledge Discovery	4,5 CR	Sure-Vetter
T-WIWI-102667	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-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	Sure-Vetter
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
T-WIWI-102669	Strategic Management of Information Technology	4,5 CR	Wolf
T-WIWI-103112	Web Science	4,5 CR	Sure-Vetter
Election block: Seminars and Advanced Labs ()			
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-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Fachbereichs Informatik
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	4,5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	4,5 CR	Zöllner
T-WIWI-109251	Selected Issues in Critical Information Infrastructures	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.

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.

Prerequisites
None.

Content
The thematic focus will be based on the choice of courses in the areas of Effiziente Algorithmen, Betriebliche Informations- und Kommunikationssysteme, Wissensmanagement, Komplexitätsmanagement and Software- und Systems Engineering.

Annotation
Detailed information on the recognition of examinations in the field of Informatics can be found at http://www.aifb.kit.edu/web/Auslandsaufenthalt.

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

M 6.30 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	Recurrence	Language	Level	Version
9	Each term	German	4	4

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-102762	Business Dynamics	4,5 CR	Geyer-Schulz
T-WIWI-102886	Business Administration in Information Engineering and Management	5 CR	Geyer-Schulz
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
T-WIWI-105946	Price Management	4,5 CR	Geyer-Schulz, Glenn
T-WIWI-102713	Telecommunication and Internet Economics	4,5 CR	Mitusch

Competence Certificate
Please note that the course "Business Administration in Information Engineering and Management" is no longer offered and that the examination is only offered in exceptional cases (see description of T-WIWI-102886).

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.

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.

Prerequisites
None

Content
What are the conditions that make electronic markets develop and how can one analyse 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 llike bounded rationality and information assymetries (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

Recommendation
None

Annotation
The course Price Management is offered for the first time in summer term 2016.

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

M 6.31 Module: Emphasis in Informatics [M-WIWI-101628]

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. York Sure-Vetter
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Informatics)

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	11

Election block: Compulsory Elective Area (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-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
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-102668	Enterprise Architecture Management	4,5 CR	Wolf
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-110863	Introduction to Data Science	4,5 CR	Herbold
T-WIWI-102666	Knowledge Discovery	4,5 CR	Sure-Vetter
T-WIWI-102667	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-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	Sure-Vetter
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
T-WIWI-102669	Strategic Management of Information Technology	4,5 CR	Wolf
T-WIWI-103112	Web Science	4,5 CR	Sure-Vetter
Election block: Seminars and Advanced Labs ()			
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-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Fachbereichs Informatik
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-109271	Advanced Lab User Studies in Security	4,5 CR	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots	4,5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	4,5 CR	Zöllner
T-WIWI-109251	Selected Issues in Critical Information Infrastructures	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.

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.

Prerequisites
None.

Content
The thematic focus will be based on the choice of courses in the areas of Effiziente Algorithmen, Betriebliche Informations- und Kommunikationssysteme, Wissensmanagement, Komplexitätsmanagement and Software- und Systems Engineering.

Annotation
Detailed information on the recognition of examinations in the field of Informatics can be found at http://www.aifb.kit.edu/web/Auslandsaufenthalt.

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

M 6.32 Module: Energy and Process Technology I [M-MACH-101296]

Responsible: Heiner Wirbser
Organisation: KIT Department of Mechanical Engineering

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

Credits	Recurrence	Duration	Level	Version
9	Each winter term	1 semester	4	1

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

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.

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

Prerequisites
None

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

Responsible: Heiner Wirbser
Organisation: KIT Department of Mechanical Engineering

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

Credits	Recurrence	Duration	Level	Version
9	Each summer term	1 semester	4	1

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

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.

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

Prerequisites
None

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 6.34 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Mandatory			
T-WIWI-107043	Liberalised Power Markets	3 CR	Fichtner
Election block: Supplementary Courses (at least 6 credits)			
T-WIWI-102691	Energy Trade and Risk Management	3 CR	Cremer, Keles
T-WIWI-102607	Energy Policy	3,5 CR	Wietschel
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-108016	Simulation Game in Energy Economics	3 CR	Genoese
T-WIWI-107446	Quantitative Methods in Energy Economics	3 CR	Keles, 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.

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.

Prerequisites
The lecture Liberalised Power Markets has to be examined.

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

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.

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

M 6.35 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	4

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-102793	Efficient Energy Systems and Electric Mobility	3,5 CR	Jochem, McKenna
T-WIWI-102650	Energy and Environment	4,5 CR	Karl
T-WIWI-102830	Energy Systems Analysis	3 CR	Ardone, Fichtner
T-WIWI-107464	Smart Energy Infrastructure	3 CR	Ardone, Pustisek
T-WIWI-102695	Heat Economy	3 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.

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.

Prerequisites
None

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 6.36 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	4	8

Election notes
The courses "Business Planning for Founders - EUCOR" and the course "International Selling - EUCOR" must be taken together.

Election block: Mandatory part (1 item)			
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
Election block: Compulsory Elective Courses (1 item)			
T-WIWI-102865	Business Planning	3 CR	Terzidis
T-WIWI-110389	Business Planning for Founders - EUCOR	3 CR	Terzidis
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management	3 CR	Terzidis
T-WIWI-102894	Entrepreneurship Research	3 CR	Terzidis
T-WIWI-110381	International Selling – EUCOR	3 CR	Casenave , Klarmann
Election block: Supplementary Courses (1 item)			
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-102851	Developing Business Models for the Semantic Web	3 CR	Sure-Vetter
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management	3 CR	Terzidis
T-WIWI-102894	Entrepreneurship Research	3 CR	Terzidis
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-102865	Business Planning	3 CR	Terzidis
T-WIWI-110389	Business Planning for Founders - EUCOR	3 CR	Terzidis
T-WIWI-110374	Firm creation in IT security	3 CR	Terzidis
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
T-WIWI-110381	International Selling – EUCOR	3 CR	Casenave , Klarmann
T-WIWI-109064	Joint Entrepreneurship Summer School	6 CR	Terzidis
T-WIWI-102612	Managing New Technologies	3 CR	Reiß
T-WIWI-102853	Roadmapping	3 CR	Koch

Competence Certificate
See German version.

Competence Goal
See German version.

Prerequisites
None

Recommendation
None

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

M 6.37 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	1

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-102650	Energy and Environment	4,5 CR	Karl
T-WIWI-100007	Transport Economics	4,5 CR	Mitusch, Szimba
T-WIWI-102615	Environmental Economics and Sustainability	5 CR	Walz
T-WIWI-102616	Environmental and Resource Policy	4 CR	Walz
T-INFO-101348	Environmental Law	3 CR	Barczak

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.

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

Prerequisites
None

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.

Recommendation
Knowledge in the area of microeconomics and of the content of the course*Economics I: Microeconomics*[2600012], respectively, is required.

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

M 6.38 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	Recurrence	Language	Level	Version
9	Each term	German	4	5

Election block: Compulsory Elective Courses (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.

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.

Prerequisites
None.

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.

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

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.

M 6.39 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	Recurrence	Level	Version
9	Once	4	5

Election block: Compulsory Elective Courses (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.

Competence Goal
See German version.

Prerequisites
The intended composition of courses, the module designation and the details of the examination for an Extracurricular Module in Engineering must be confirmed by a module coordinator (professor) of the responsible engineering department. The module coordinator makes sure that the individual courses of the module complement each other in a meaningful way and that no random sequence of various individual examinations is combined.

The responsible module coordinator certifies that the examination can be taken as described and that the details of the courses in the application are correct.

The informal application (not handwritten!) will then be submitted to the Examination Office of the KIT Department of Economics and Management.

The examination board of the KIT Department of Economics and Management decides on the basis of the rules and regulations that have been adopted, in particular with regard to the content (see also https://www.wiwi.kit.edu/Genehmigung_Ingenieurmodul.php_Ingenieurmodul.php) as well as the application form completed by the student and signed by the respective module coordinator.

A maximum of one Extracurricular Module in Engineering can be taken.

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 6.40 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	1

Election block: Compulsory Elective Courses (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.

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

Prerequisites
None

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 6.41 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-110513	Advanced Empirical Asset Pricing	4,5 CR	Thimme
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
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-102644	Fixed Income Securities	4,5 CR	Uhrig-Homburg
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-102645	Credit Risk	4,5 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes
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.

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.

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.

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 6.42 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-110513	Advanced Empirical Asset Pricing	4,5 CR	Thimme
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy	4,5 CR	Ruckes
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-102644	Fixed Income Securities	4,5 CR	Uhrig-Homburg
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-102645	Credit Risk	4,5 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes
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.

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.

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.

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 6.43 Module: FinTech Innovations [M-WIWI-105036]

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

Credits	Recurrence	Language	Level	Version
9	Each term	English	4	1

Mandatory			
T-WIWI-106193	Engineering FinTech Solutions	9 CR	Ulrich

Competence Certificate
The assessment is carried out in form of a written thesis based on the course "Engineering FinTech Solutions".

Competence Goal
Students with a strong technological background and/or a strong interest for software development and investments will learn how to build a prototype that automates essential steps for a fully automated investment and risk management process. Students also learn to organize themselves efficiently in teams of several developers in order to complete a prototype in a limited amount of time. Moreover, students deepen their understanding of finance and technology and learn how to combine both in an effective way. Students will hence be well prepared to become leaders and pioneers for upcoming FinTech innovations (and beyond) to help society to better invest for the future and to better protect from adverse risks.

Prerequisites
see T-WIWI-106193 "Engineering FinTech Solutions"

Content
The module is targeted to students with strong knowledge in the field of computational risk and asset management and strong programming skills. It offers students the opportunity to develop an algorithmic solution and hence ample their programming experience and their understanding of financial economics or asset and risk management.

Recommendation
None

Workload
Total effort for 9 credit points: approx. 270 hours.

M 6.44 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	Recurrence	Duration	Language	Level	Version
9	Each summer term	2 semester	German/English	4	3

Election block: Compulsory Examination (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
Election block: Electives (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-WIWI-103174	Seminar Mobility Services (Master)	3 CR	Satzger, Stryja
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

Competence Goal
See German version.

Prerequisites
None

Recommendation
None

M 6.45 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	2

Election block: compulsory optional subject (at least 9 credits)			
T-ETIT-100830	Power Network	6 CR	Leibfried
T-ETIT-101941	Power Transmission and Power Network Control	5 CR	Leibfried
T-ETIT-100724	Photovoltaic System Design	3 CR	Grab
T-ETIT-101915	High-Voltage Test Technique	4 CR	Badent

Competence Goal
The student

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

Prerequisites
None

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 6.46 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	Recurrence	Language	Level	Version
9	Each term	German	4	4

Mandatory			
T-MACH-105158	Global Production and Logistics - Part 1: Global Production	4 CR	Lanza
T-MACH-105159	Global Production and Logistics - Part 2: Global Logistics	4 CR	Furmans
Election block: Globale Produktion und Logistik (Ergänzungsbereich) (1 item)			
T-MACH-102128	Information Systems and Supply Chain Management	3 CR	Kilger
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-105783	Learning Factory "Global Production"	4 CR	Lanza
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry	4 CR	Wawerla

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.

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.

Prerequisites
None

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 6.47 Module: Governance, Risk & Compliance [M-INFO-101242]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	5

Mandatory			
T-INFO-101288	Corporate Compliance	3 CR	Dreier
Election block: Governance, Risk & Compliance (at least 1 item as well as at least 6 credits)			
T-INFO-101316	Law of Contracts	3 CR	Dreier
T-INFO-108405	Data Protection by Design	3 CR	Raabe
T-INFO-102047	Seminar: Governance, Risk & Compliance	3 CR	Dreier
T-INFO-109910	IT- Security Law	3 CR	Raabe

M 6.48 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	3

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102785	Theory of Endogenous Growth	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.

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

Prerequisites
None

Content
The module includes the contents of the lectures *Endogenous Growth Theory* [2561503], *Spatial Economics* [2561260] and *International Economic Policy* [2560254]. While the first two lectures have a more formal-analytic focus, the third lecture approaches fundamental ideas and problems from the field of international economic policy from a more verbal perspective.

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

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.

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

M 6.49 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	4

Election block: Vehicle Properties (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-105156	Vehicle Mechatronics I	3 CR	Ammon
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.

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.

Prerequisites
None

Content
See courses.

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.

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.

M 6.50 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	Recurrence	Duration	Level	Version
9	Each term	2 semester	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 6.51 Module: Highway Engineering [M-BGU-100999]

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

Credits	Recurrence	Duration	Level	Version
9	Each summer term	1 semester	4	2

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

Competence Goal
See German version.

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

Recommendation
None

Annotation
None

Workload
See German version.

M 6.52 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	Recurrence	Duration	Language	Level	Version
9	Each winter term	1 semester	German/English	4	2

Mandatory			
T-WIWI-102631	Planning and Management of Industrial Plants	5,5 CR	Schultmann
Election block: Supplementary Courses (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, Wiens
T-WIWI-102828	Supply Chain Management in the Automotive Industry	3,5 CR	Heupel, Lang
T-WIWI-103134	Project Management	3,5 CR	Schultmann
Election block: Supplementary Courses (at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-102882	International Management in Engineering and Production	3,5 CR	Sasse
T-WIWI-110512	Life Cycle Assessment	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.

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.

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

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 6.53 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	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German/English	4	2

Mandatory			
T-WIWI-102632	Production and Logistics Management	5,5 CR	Glöser-Chahoud, Schultmann
Election block: Supplementary Courses from Module Industrial Production II (at most 1 item)			
T-WIWI-102634	Emissions into the Environment	3,5 CR	Karl
T-WIWI-102882	International Management in Engineering and Production	3,5 CR	Sasse
T-WIWI-110512	Life Cycle Assessment	3,5 CR	Schultmann
Election block: Supplementary Courses (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, Wiens
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.

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.

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

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 6.54 Module: Informatics [M-WIWI-101472]

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. York Sure-Vetter
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: Informatics

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	12

Election block: Compulsory Elective Area ()			
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-109248	Critical Information Infrastructures	4,5 CR	Sunyaev
T-WIWI-109246	Digital Health	4,5 CR	Sunyaev
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-102668	Enterprise Architecture Management	4,5 CR	Wolf
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-110863	Introduction to Data Science	4,5 CR	Herbold
T-WIWI-102666	Knowledge Discovery	4,5 CR	Sure-Vetter
T-WIWI-102667	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-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	Sure-Vetter
T-WIWI-102895	Software Quality Management	4,5 CR	Oberweis
T-WIWI-102669	Strategic Management of Information Technology	4,5 CR	Wolf
T-WIWI-103112	Web Science	4,5 CR	Sure-Vetter
Election block: Seminars and Advanced Labs (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-110548	Advanced Lab Informatics (Master)	4,5 CR	Professorenschaft des Fachbereichs Informatik
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	4,5 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning	4,5 CR	Zöllner
T-WIWI-109251	Selected Issues in Critical Information Infrastructures	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.

Please note the following information about the module component exams of Prof. Dr. H. Schmeck:

The examinations in Algorithms for Internet Applications [T-WIWI-102658], Efficient Algorithms [T-WIWI-102655], Organic Computing [T-WIWI-102659] and Smart Energy Distribution [T-WIWI-102845] are offered latest until summer term 2017 (repeaters only).

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.

Prerequisites
It is only allowed to choose one lab.

Content
The thematic focus will be based on the choice of courses in the areas of Effiziente Algorithmen, Betriebliche Informations- und Kommunikationssysteme, Wissensmanagement, Komplexitätsmanagement and Software- und Systems Engineering.

Annotation
Detailed information on the recognition of examinations in the field of Informatics can be found at http://www.aifb.kit.edu/web/Auslandsaufenthalt.

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

M 6.55 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	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	6

Mandatory			
T-WIWI-110373	Advanced Information Systems	5 CR	Mädche, Weinhardt
Election block: Supplementary Courses (between 4 and 4,5 credits)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-102640	Market Engineering: Information in Institutions	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 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 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 lecture *Foundations of Information Systems*, a clear distinction of information as a production, competitive, and economic good is introduced. The central role of information is explained through the concept of the "information lifecycle". The single phases from existence/generation through allocation and evaluation until the distribution and usage of information are analyzed from the business administration perspective and the microeconomic perspective.

In a second course 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 6.56 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	Recurrence	Language	Level	Version
9	Each term	German	4	3

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-110851	Designing Interactive Systems	4,5 CR	Mädche, Morana
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	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.

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

Prerequisites
None

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 6.57 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	3

Election block: Compulsory Elective Courses (between 9 and 10 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102785	Theory of Endogenous Growth	4,5 CR	Ott
T-WIWI-102840	Innovation Theory and Policy	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.

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

Prerequisites
None

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.

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.

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.

M 6.58 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	4	2

Election block: Compulsory Elective Courses (between 9 and 10 credits)			
T-WIWI-102840	Innovation Theory and Policy	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.

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

Prerequisites
None

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.

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.

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

M 6.59 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	7

Mandatory			
T-WIWI-102893	Innovation Management: Concepts, Strategies and Methods	3 CR	Weissenberger-Eibl
Election block: Compulsory Elective Courses (1 item)			
T-WIWI-102873	Current Issues in Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-110867	The negotiation of open innovation	3 CR	Beyer
T-WIWI-108875	Digital Transformation and Business Models	3 CR	Koch
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-108774	Analyzing and Evaluating Innovation Processes	3 CR	Beyer
T-WIWI-110234	Innovation Processes Live	3 CR	Beyer
T-WIWI-110263	Methods in Innovation Management	3 CR	Koch
T-WIWI-102853	Roadmapping	3 CR	Koch
T-WIWI-109932	A Closer Look at Social Innovation	3 CR	Beyer
T-WIWI-102858	Technology Assessment	3 CR	Koch
T-WIWI-102854	Technologies for Innovation Management	3 CR	Koch
Election block: Supplementary Courses (1 item)			
T-WIWI-102873	Current Issues in Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-102866	Design Thinking	3 CR	Terzidis
T-WIWI-110867	The negotiation of open innovation	3 CR	Beyer
T-WIWI-108875	Digital Transformation and Business Models	3 CR	Koch
T-WIWI-102833	Entrepreneurial Leadership & Innovation Management	3 CR	Terzidis
T-WIWI-102864	Entrepreneurship	3 CR	Terzidis
T-WIWI-102852	Case Studies Seminar: Innovation Management	3 CR	Weissenberger-Eibl
T-WIWI-108774	Analyzing and Evaluating Innovation Processes	3 CR	Beyer
T-WIWI-110234	Innovation Processes Live	3 CR	Beyer
T-WIWI-110263	Methods in Innovation Management	3 CR	Koch
T-WIWI-102853	Roadmapping	3 CR	Koch
T-WIWI-109932	A Closer Look at Social Innovation	3 CR	Beyer
T-WIWI-102854	Technologies for Innovation Management	3 CR	Koch
T-WIWI-102858	Technology Assessment	3 CR	Koch

Competence Certificate
See German version.

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.

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.

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.

Recommendation
None

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

M 6.60 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	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	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)

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.

Prerequisites
none

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

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	3

Election block: Intellectual Property Law (at least 1 item as well as at least 9 credits)			
T-INFO-102036	Computer Contract Law	3 CR	Dreier
T-INFO-101308	Copyright	3 CR	Dreier
T-INFO-101310	Patent Law	3 CR	Dreier
T-INFO-101313	Trademark and Unfair Competition Law	3 CR	Matz
T-INFO-101307	Internet Law	3 CR	Dreier
T-INFO-108462	Selected Legal Isues of Internet Law	3 CR	Dreier

Prerequisites
None

M 6.62 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	Recurrence	Language	Level	Version
9	Each winter term	German	4	2

Mandatory			
T-BGU-108000	Lean Construction	4,5 CR	Haghsheno
T-BGU-101007	Project Paper Lean Construction	1,5 CR	Haghsheno
Election block: Electives (between 1 and 2 items as well as between 3 and 4,5 credits)			
T-BGU-103430	Turnkey Construction I - Processes and Methods	1,5 CR	Haghsheno
T-BGU-103431	Turnkey Construction II - Trades and Technology	3 CR	Haghsheno
T-BGU-103427	Site Management	1,5 CR	Haghsheno
T-BGU-103429	Building Laws	3 CR	Haghsheno
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
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.

The exam must be repeated at the latest 2 semesters after the first try. The exam will be based on the content of the latest lecture.

The exam of of the course Lean Construction consists of a preparatory and oral assessment. The preparatory assessment is a group work and consists of an assignment with presentation. The preparatory assessment is precondition to attend the oral examination (30 min) of the course Lean Construction. The grade of the exam Lean Construction is defined by weighted average of grades for oral examination (75 %) and preparatory assignment (25 %).

Examination of courses Projektmanagement in der Bau- und Immobilienwirtschaft I, Projektmanagement in der Bau- und Immobilienwirtschaft II, and Baurecht are carried out written. Combinations of courses Schlüsselfertiges Bauen I, Schlüsselfertiges Bauen II, Bauleitung, and Nachtragsmanagementare examined orally.

Competence Goal
see German version

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

Prerequisites
The course Lean Construction is compulsory and must be examined.

Content
see German version

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

Annotation
none

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

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 6.63 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	Recurrence	Language	Level	Version
9	Each summer term	German/English	4	1

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).

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.

Prerequisites
None

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.

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 6.64 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	Recurrence	Duration	Language	Level	Version
9	Each winter term	1 semester	German	4	3

Mandatory			
T-MACH-102158	Machine Tools and Industrial Handling	9 CR	Fleischer

Competence Certificate
Written exam (120 minutes)

Competence Goal
The students

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

Prerequisites
None

Content
The module overviews the construction, use and application of machine tools and industrial handling equipment. A well-founded and practice-oriented knowledge is imparted about the selection, design and evaluation of machine tools. First, the main components of the machine tools are systematically explained and their design principles as well as the integral machine tool design are discussed. Subsequently, the use and application of machine tools 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.

The individual topics are:

- Frames and frame components
- Feed axes
- Spindles
- Peripheral equipment
- Control unit
- Metrological evaluation and machine testing
- Process monitoring
- Maintenance of machine tools
- Safety assessment of machine tools
- Machine examples

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

Learning type
Lecture, exercise, excursio

M 6.65 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	Recurrence	Language	Level	Version
18	Each winter term	German	4	2

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

Competence Certificate
oral examination (60 minutes)

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.

Prerequisites
None

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 "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.

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

Learning type
lecture
tutorial
product development project

M 6.66 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	English	4	2

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.

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.

Prerequisites
None

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 6.67 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	Recurrence	Duration	Language	Level	Version
9	Each winter term	1 semester	German	4	5

Mandatory			
T-MACH-102105	Manufacturing Technology	9 CR	Schulze, Zanger

Competence Certificate
Written Exam (180 min)

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.

Prerequisites
None

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 6.68 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Mandatory			
T-WIWI-102640	Market Engineering: Information in Institutions	4,5 CR	Weinhardt
Election block: Supplementary Courses (4,5 credits)			
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-108880	Blockchains & Cryptofinance	4,5 CR	Schuster, Uhrig-Homburg
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-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.

Prerequisites
The course *Market Engineering: Information in Institutions* [2540460] is compulsory and must be examined.

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.

Recommendation
None

Annotation
The course "Computational Economics" [2590458] will not be offered any more in this module from winter term 2015/2016 on. The examination will be offered latest until summer term 2016 (repeaters only).

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

M 6.69 Module: Marketing and Sales Management [M-WIWI-105312]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Business Administration

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German/English	4	1

Election block: Compulsory Elective Courses (at least 1 item)			
T-WIWI-107720	Market Research	4,5 CR	Klarmann
T-WIWI-109864	Product and Innovation Management	3 CR	Klarmann
Election block: Supplementary Courses (at most 1 item)			
T-WIWI-102834	Case Studies in Sales and Pricing	1,5 CR	Klarmann
T-WIWI-106981	Digital Marketing and Sales in B2B	1,5 CR	Konhäuser
T-WIWI-102835	Marketing Strategy Business Game	1,5 CR	Klarmann
T-WIWI-102891	Price Negotiation and Sales Presentations	1,5 CR	Klarmann, Schröder
T-WIWI-110920	Real World Lab: Innovation Communication	1,5 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.

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

Prerequisites
None

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

Annotation
Please note that only one of the listed 1,5-ECTS courses can be chosen in the module.

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

M 6.70 Module: Material Flow in Logistic Systems [M-MACH-101277]

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

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

Credits	Recurrence	Language	Level	Version
9	Each winter term	German	4	3

Mandatory			
T-MACH-102151	Material Flow in Logistic Systems	9 CR	Furmans

Competence Certificate
The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
  - 40% assessment of the result of the case studies as group work,
  - 20% assessment of the oral examination during the case study colloquiums as individual performance.

A detailed description of the learning control can be found under T-MACH-102151.

Competence Goal
The student

- acquires comprehensive and well-founded knowledge on the main topics of logistics, an overview of different logistic questions in practice and knows the functionality of material handling systems,
- is able to illustrate logistic systems with adequate accuracy by using simple models,
- is able to realize coherences within logistic systems,
- is able to evaluate logistic systems by using the learnt methods.

Prerequisites
none

Content
The module *Material Flow in Logistic Systems* provides comprehensive and well-founded basics for the main topics of logistics. Within the lectures, the interaction between several components of logistic systems will be shown. The module focuses on technical characteristics of material handling systems as well as on methods for illustrating and evaluating logistics systems. To gain a deeper understanding, the course is accompanied by exercises and case studies.

Workload
270 hours

Learning type
Lectures, tutorials.

M 6.71 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	4

Mandatory			
T-MACH-105189	Mathematical Models and Methods for Production Systems	6 CR	Baumann, Furmans
Election block: Material flow in interconnected logistics systems ()			
T-MACH-105174	Warehousing and Distribution Systems	3 CR	Furmans
T-MACH-105175	Airport Logistics	3 CR	Richter
T-MACH-105159	Global Production and Logistics - Part 2: 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-105171	Safety Engineering	4 CR	Kany
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Braun, Schönung

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 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.

Prerequisites
none

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.

Recommendation
It is recommended to successfully complete the course "Material Flow in Logistics Systems" [T-MACH-102151] before starting the module.

Workload
Regular attendance: 270 hours (9 credits). Lectures with 180 hours attendance 6 credits. Lectures with 120 hours 4 credits.

Learning type
Lecture, tutorial.

M 6.72 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	6

Election block: Compulsory Elective Courses (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-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
Election block: Supplementary Courses (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-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

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.

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.

Prerequisites
At least one of the courses "Mixed Integer Programming I", "Parametric Optimization", "Convex Analysis", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.

Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

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. For further information see German version.

M 6.73 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	3

Election block: Compulsory Elective Courses (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-102859	Social Choice Theory	4,5 CR	Puppe
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
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 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.

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.

An example of a positive question is: which regulation policy results in which firm decistions under imperfect competition? An example of a normative question is: which voting rule has appealing properties?

Prerequisites
None

Content
The student should gain an understanding of advanced topics in economic theory, game theory and welfare economics. Core topics are, among others, strategic interactions in markets, cooperative and non-cooperative bargaining (Advanced Game Theory), allocation under asymmetric information and general equilibrium over time (Advanced Topics in Economic Theory), voting and the aggregation of preferences and judgements (Social Choice Theory).

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

M 6.74 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Mandatory			
T-MACH-102166	Fabrication Processes in Microsystem Technology	3 CR	Bade
Election block: Mikrofertigung (Ergänzungsbereich) (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

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 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.

Prerequisites
none

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 6.75 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Election block: Mikrooptik (at least 9 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-101910	Microactuators	3 CR	Kohl
T-ETIT-100741	Laser Physics	4 CR	Koos
T-ETIT-101945	Optical Waveguides and Fibers	4 CR	Koos
T-MACH-109122	X-ray Optics	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.

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

Prerequisites
none

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 6.76 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Election block: Mikrosystemtechnik (at least 9 credits)			
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-102172	Bionics for Engineers and Natural Scientists	3 CR	Hölscher
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-102080	Nanotechnology with Clusterbeams	3 CR	Gspann
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

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
construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

Prerequisites
Successful passing of the corresponding modules of the basic program.

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 6.77 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Mandatory			
T-MACH-105168	Mobile Machines	9 CR	Geimer
Election block: Mobile Arbeitsmaschinen (at least 3 credits)			
T-MACH-102093	Fluid Power Systems	5 CR	Geimer, Pult
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-102150	BUS-Controls	3 CR	Becker, Geimer
T-MACH-108889	BUS-Controls - Advance	0 CR	Daiß, Geimer
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer, Xiang
T-MACH-108888	Simulation of Coupled Systems - Advance	0 CR	Geimer, Xiang
T-MACH-105160	Fundamentals in the Development of Commercial Vehicles I	1,5 CR	Zürn
T-MACH-105161	Fundamentals in the Development of Commercial Vehicles II	1,5 CR	Zürn

Competence Certificate
The assessment is carried out as a general oral exam (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.

Competence Goal
The student

- knows and understands the basic structure of the machines
- masters the basic skills to develop the selected machines

Prerequisites
Knowledge in the field of fluid technology is assumed.

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.

Recommendation
We recommend that you attend the Fluidpower [2114093] event before.

Workload
360 hours

Learning type

- Research-oriented teaching
- lectures
- exercises

M 6.78 Module: Module Master Thesis [M-WIWI-101650]

Responsible: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: Master Thesis

Credits	Recurrence	Language	Level	Version
30	Each term	German	4	2

Mandatory			
T-WIWI-103142	Master Thesis	30 CR	Studiendekan der KIT-Fakultät für Informatik, Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

Competence Certificate
The Master Thesis is a written exam which shows that the student can autonomously investigate a scientific problem in Industrial Engineering and Management. The Master Thesis is described in detail in § 11 of the examination regulation.

The review is carried out by at least one examiner of the Department of Economics and Management, or, after approval by at least one examiner of another faculty. The examiner has to be involved in the degree programme. Involved in the degree programme are the persons that coordinate a module or a lecture of the degree programme.

The regular processing time takes six months. On a reasoned request of the student, the examination board can extend the processing time of a maximum of three month. If the Master Thesis is not completed in time, this exam is "failed", unless the student is not being responsible (eg maternity leave).
With consent of the examinor the thesis can be written in English as well. Other languages require besides the consent of the examiner the approval of the examination board. The issue of the Master Thesis may only returned once and only within the first month of processing time. A new topic has to be released within four weeks.

The module grade is the grade for the Master Thesis.

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.

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: "I hereby declare that I produced this thesis without external assistance, and that no other than the listed references have been used as sources of information. Passages taken literally or analogously from published or non published sources is marked as this." If this declaration is not given, the Master Thesis will not be accepted.

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
The total workload for this module is approximately 900 hours. For further information see German version.

M 6.79 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Mandatory			
T-MACH-105180	Nanotechnology for Engineers and Natural Scientists	4 CR	Dienwiebel, Hölscher, Walheim
Election block: Nanotechnologie (Ergänzungsbereich) (at least 5 credits)			
T-MACH-102080	Nanotechnology with Clusterbeams	3 CR	Gspann
T-MACH-102167	Nanotribology and -Mechanics	3 CR	Dienwiebel, Hölscher
T-MACH-102164	Practical Training in Basics of Microsystem Technology	3 CR	Last
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-MACH-102172	Bionics for Engineers and Natural Scientists	3 CR	Hölscher
T-ETIT-100740	Quantum Functional Devices and Semiconductor Technology	3 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.

Competence Goal
The student

- has detailed knowledge in the field of nanotechnology
- is able to evaluate the specific characteristics of nanosystems.

Prerequisites
none

Content
The module deals with the most important principles and fundamentals of modern nanotechnology. The compulsory module “Nanotechnology with scanning probe methods” 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

M 6.80 Module: Natural Hazards and Risk Management [M-WIWI-104837]

Responsible: Prof. Dr. Michael Kunz
Organisation: KIT Department of Economics and Management
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	1

Election block: Wahlpflichtangebot (between 9 and 12 credits)			
T-BGU-101499	Introduction to Hydrogeology	5 CR	Goldscheider
T-BGU-108943	Engineering Hydrology	3 CR	Ehret
T-BGU-106597	Management of Water Resources and River Basins	6 CR	Ehret
T-BGU-101859	Morphodynamics	3 CR	Nestmann
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.

Competence Goal
See German version

Prerequisites
None

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 6.81 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	2

Election block: Compulsory Elective Courses (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-102713	Telecommunication and Internet Economics	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.

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.

Prerequisites
None

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.

Recommendation
Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required.

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

M 6.82 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	Recurrence	Language	Level	Version
9	Each term	German	4	7

Election block: Compulsory Elective Courses (at most 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
Election block: Supplementary Courses (at most 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	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-110162	Optimization Models and Applications	4,5 CR	Sudermann-Merx
T-WIWI-106549	Large-scale 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.

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.

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.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

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.

Recommendation
Basic knowledge as conveyed in the module *Introduction to Operations Research* is assumed.

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

M 6.83 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	Recurrence	Language	Level	Version
9	Each term	German	4	2

Election block: Optoelektronik und Optische Kommunikationstechnik (Kernbereich) (1 item)			
T-ETIT-100639	Optical Transmitters and Receivers	6 CR	Freude
Election block: Optoelektronik und Optische Kommunikationstechnik (Ergänzungsbereich) (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	Koos
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.

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.

Prerequisites
none

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 6.84 Module: Principles of Food Process Engineering [M-CIWVT-101120]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Duration	Level	Version
9	Each term	2 semester	4	1

Mandatory			
T-CIWVT-101874	Principles of Food Process Engineering	9 CR	Gaukel

Competence Goal
See German version.

Prerequisites
none

M 6.85 Module: Private Business Law [M-INFO-101216]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	3

Election block: Private Business Law (at least 1 item as well as at least 9 credits)			
T-INFO-101329	Employment Law I	3 CR	Dreier
T-INFO-101330	Employment Law II	3 CR	Dreier
T-INFO-101315	Tax Law I	3 CR	Dreier
T-INFO-101314	Tax Law II	3 CR	Dietrich, Dreier
T-INFO-101316	Law of Contracts	3 CR	Dreier

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.

Prerequisites
None

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 6.86 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	Recurrence	Duration	Language	Level	Version
9	Each winter term	1 semester	German	4	1

Mandatory			
T-BGU-101844	Process Engineering	3 CR	Schneider
Election block: Electives (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'

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.

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

Prerequisites
The course Verfahrenstechnik [6241704] is compulsory and must be examined.

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.

Recommendation
none

Annotation
None

Workload
see German version

M 6.87 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	Recurrence	Language	Level	Version
9	Each winter term	German	4	1

Mandatory			
T-BGU-103432	Project Management in Construction and Real Estate Industry I	3 CR	Haghsheno
T-BGU-103431	Turnkey Construction II - Trades and Technology	3 CR	Haghsheno
Election block: Electives (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-103430	Turnkey Construction I - Processes and Methods	1,5 CR	Haghsheno
T-BGU-103428	Supplementary Claim Management	1,5 CR	Haghsheno
T-BGU-103429	Building Laws	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 written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-103431 with oral examination according to § 4 Par. 2 No. 2

according to selected course:

- 'Teilleistung' T-BGU-103427 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103430 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103428 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103429 with oral examination according to § 4 Par. 2 No. 2
- 'Teilleistung' T-BGU-103433 with oral examination according to § 4 Par. 2 No. 2

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

Competence Goal
see German version

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

Prerequisites
The courses Projektmanagement in der Bau- und Immobilienwirtschaft I and Schlüsselfertiges Bauen II are compulsory and must be examined.

Content
see German version

Recommendation
none

Annotation
none

Workload
see German version

Literature

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WÜRFELE, Falk [Hrsg.]: Nachtragsmanagement - Leistungsbeschreibung, Leistungsabweichung, Bauzeitverzögerung, Werner, Neuwied, 2006.
SCHERER, Holger: Integriertes Nachtragsmanagement - Verfahrenshandbuch für die Dokumentation von Behinderungen, Störungen und Nachtragssachverhalten auf der Grundlage der VOB, Zeittechnik-Verlag, Neu-Isenburg, 2001.
HELLER, Jörg: Sicherung der Nachtragsvergütung nach VOB und BGB, Zeittechnik-Verlag, Neu-Isenburg, 2000

M 6.88 Module: Public Business Law [M-INFO-101217]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	4	3

Election block: Public Business Law (at least 1 item as well as at least 9 credits)			
T-INFO-101309	Telecommunications Law	3 CR	Marsch
T-INFO-101303	Data Protection Law	3 CR	Marsch
T-INFO-101311	Public Media Law	3 CR	Dreier
T-INFO-101312	European and International Law	3 CR	Brühann
T-INFO-101348	Environmental Law	3 CR	Barczak

Competence Certificate
see course description.

M 6.89 Module: Rail System Technology [M-MACH-101274]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	4

Mandatory			
T-MACH-102143	Rail System Technology	9 CR	Gratzfeld

Competence Certificate
Oral examination

Duration: ca. 45 minutes

No tools or reference materials may be used during the exam.

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, power networks, filling stations
8. History (optional)
9. Vehicle system technology: structure and main systems of rail vehicles
10. Car body: functions, requirements, design principles, crash elements, interfaces
11. Bogies: forces, running gears, axle configuration
12. Drives: vehicle with/without contact wire, dual-mode vehicle
13. Brakes: tasks, basics, principles, blending, brake control
14. Train control management system: definitions, networks, bus systems, components, examples
15. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck coaches, 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 6.90 Module: Safety, Computing and Law in Highway Engineering [M-BGU-101066]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each winter term	2 semester	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

Competence Goal
See German version.

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).

Recommendation
None

Annotation
None

M 6.91 Module: Seminar Module [M-WIWI-101808]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	6

Election block: Seminar in Economics and Management, Mathematics and Law (between 3 and 6 credits)			
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 Fachbereichs Informatik
T-WIWI-103480	Seminar in Informatics B (Master)	3 CR	Professorenschaft des Fachbereichs Informatik
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	Dreier
T-INFO-105945	Seminar: Legal Studies II	3 CR	Dreier
Election block: Seminar in Engineering Science (at most 1 item)			
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-BGU-100014	Seminar in Transportation	3 CR	Chlond, Vortisch
T-WIWI-108763	Seminar in Engineering Science Master (approval)	3 CR	Fachvertreter ingenieurwissenschaftlicher Fakultäten
T-WIWI-110215	Wildcard Seminar Module Master	3 CR	
Election block: SQ-Seminar (between 3 and 4 credits)			
T-WIWI-104680	Wildcard Key Competences Seminar 1	1 CR	
T-WIWI-104681	Wildcard Key Competences Seminar 2	2 CR	
T-WIWI-104682	Wildcard Key Competences Seminar 3	3 CR	
T-WIWI-104683	Wildcard Key Competences Seminar 4	1 CR	
T-WIWI-104684	Wildcard Key Competences Seminar 5	2 CR	
T-WIWI-104685	Wildcard Key Competences Seminar 6	3 CR	
T-WIWI-105956	Wildcard Key Competences Seminar 8	4 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.

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.

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 a 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].

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 6.92 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	Recurrence	Level	Version
9	Each summer term	4	2

Mandatory			
T-ETIT-101911	Sensors	3 CR	Menesklou
Election block: Compulsory Elective (at most 2 items as well as at least 6 credits)			
T-ETIT-100706	Sensors and Actuators Laboratory	6 CR	Menesklou
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 the module *Sensorik II* [WI4INGETIT5] or other modules.

Before *Experimental Laboratories in Sensors and Actuators* [23232] the course *Sensor Technology* [23231] has to be completed successfully.

Recommendation
Knowledge of electrical engineering is assumed. Therefore it is recommended to attend the courses *Electrical Engineering II* [23224] beforehand.

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

M 6.93 Module: Sensor Technology II [M-ETIT-101159]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Duration	Level	Version
9	Each summer term	1 semester	4	2

Election block: Compulsory Elective (at least 9 credits)			
T-ETIT-100706	Sensors and Actuators Laboratory	6 CR	Menesklou
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.

Competence Goal
The student

- acquires fundamental principles in materials science and device technology of sensors.
- applies materials and sensors from the viewpoint of an application or development engineer.

Prerequisites
It is only possible to choose this module in combination with the module *Sensor Technology I* [WI4INGETIT3]. The module is passed only after the final partial exam of *Sensor Technology I* is additionally passed.

Content
The operating principles of the most important sensors are taught. The student will learn to use the acquired knowledge for key issues relating to select and use sensors. Sensor module I gives an overview of the basic sensor principles. Sensor module II goes into specific topics of sensors and actuators further.

Recommendation
Knowledge of electrical engineering is assumed. Therefore it is recommended to attend the courses *Electrical Engineering II* [23224] beforehand.

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

M 6.94 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	Recurrence	Language	Level	Version
9	Each term	German	4	5

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-102822	Industrial Services	4,5 CR	Fromm
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-105778	Service Analytics A	4,5 CR	Fromm
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.

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

Prerequisites
None

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.

Recommendation
The course Service Analytics A [2595501] should be taken.

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.

M 6.95 Module: Service Design Thinking [M-WIWI-101503]

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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	English	4	1

Mandatory			
T-WIWI-102849	Service Design Thinking	12 CR	Satzger

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).

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.

Prerequisites
None

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.

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.

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.

M 6.96 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	Recurrence	Language	Level	Version
9	Each term	German	4	3

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-110280	Digital Services: Business Models and Transformation	4,5 CR	Satzger
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-102640	Market Engineering: Information in Institutions	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
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.

Prerequisites
None

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.

Recommendation
None

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.

M 6.97 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	Recurrence	Language	Level	Version
9	Each term	German	4	3

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-110877	Engineering Interactive Systems	4,5 CR	
T-WIWI-102639	Business Models in the Internet: Planning and Implementation	4,5 CR	Weinhardt
T-WIWI-110887	Practical Seminar: Service Innovation	4,5 CR	Satzger
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	4,5 CR	Mädche
T-WIWI-102641	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.

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.

Prerequisites
Dependencies between courses:

The course Practical Seminar Service Innovation cannot be applied in combination with the course Practical Seminar Digital Service Design.

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.

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].

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.

M 6.98 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	Recurrence	Language	Level	Version
9	Each term	German/English	4	5

Mandatory			
T-WIWI-110280	Digital Services: Business Models and Transformation	4,5 CR	Satzger
Election block: Supplementary Courses (4,5 credits)			
T-WIWI-108715	Artificial Intelligence in Service Systems	4,5 CR	Satzger
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-102822	Industrial Services	4,5 CR	Fromm
T-WIWI-102899	Modeling and Analyzing Consumer Behavior with R	4,5 CR	Dorner, Weinhardt
T-WIWI-105778	Service Analytics A	4,5 CR	Fromm
T-WIWI-102641	Service Innovation	4,5 CR	Satzger

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

- 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.

Prerequisites
The course "Digital Services: Business Models and Transformation" is compulsory and must be examined.

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.

Recommendation
None

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

M 6.99 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	Recurrence	Language	Level	Version
9	Each term	German	4	6

Election block: Compulsory Elective Courses (at most 2 items)			
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Nickel
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
Election block: Supplementary Courses (at most 2 items)			
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr

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
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

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.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

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.

Recommendation
The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.

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.

M 6.100 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	Recurrence	Duration	Level	Version
9	Each term	1 semester	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

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.

Prerequisites
Students must pass three excersise sheets within the seminar "Computer based data analysis".

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 6.101 Module: Specialization in Food Process Engineering [M-CIWVT-101119]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	1

Mandatory			
T-CIWVT-101875	Specialization in Food Process Engineering	9 CR	Gaukel

Competence Goal
See German version.

Prerequisites
The module "Principles of Food Process Engineering" must be passed.

Content
See courses.

M 6.102 Module: Specialization in Production Engineering [M-MACH-101284]

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

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	4	3

Election block: Vertiefung der Produktionstechnik (at least 9 credits)			
T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry	4 CR	Wawerla
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-105783	Learning Factory "Global Production"	4 CR	Lanza
T-MACH-108878	Laboratory Production Metrology	4 CR	Häfner
T-MACH-110318	Product- and Production-Concepts for modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-105185	Control Technology	4 CR	Gönnheimer
T-MACH-105177	Metal Forming	3 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.

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.

Prerequisites
none

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 6.103 Module: Specific Topics in Materials Science [M-MACH-101268]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

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

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	2

Election block: Spezielle Werkstoffkunde (at least 9 credits)			
T-MACH-102141	Constitution and Properties of Wearresistant Materials	4 CR	Ulrich
T-MACH-100287	Introduction to Ceramics	6 CR	Hoffmann
T-MACH-102099	Experimental Lab Class in Welding Technology, in Groups	4 CR	Dietrich
T-MACH-102111	Principles of Ceramic and Powder Metallurgy Processing	4 CR	Schell
T-MACH-102154	Laboratory Laser Materials Processing	4 CR	Schneider
T-MACH-102102	Physical Basics of Laser Technology	5 CR	Schneider
T-MACH-102137	Polymer Engineering I	4 CR	Elsner, Liebig
T-MACH-102138	Polymer Engineering II	4 CR	Elsner, Liebig
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
T-MACH-102157	High Performance Powder Metallurgy Materials	4 CR	Schell
T-MACH-102179	Structural Ceramics	4 CR	Hoffmann
T-MACH-102182	Ceramic Processing Technology	4 CR	Binder
T-MACH-102170	Structural and Phase Analysis	4 CR	Wagner
T-MACH-105150	Constitution and Properties of Protective Coatings	4 CR	Ulrich
T-MACH-105170	Welding Technology	4 CR	Farajian
T-MACH-105164	Laser in Automotive Engineering	4 CR	Schneider
T-MACH-105157	Foundry Technology	4 CR	Wilhelm
T-MACH-105178	Practical Course Technical Ceramics	1 CR	Schell

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.

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
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.

Prerequisites
None

Content
See courses.

Workload
The module requires an average workload of 270 hours.

M 6.104 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	8

Election block: Compulsory Elective Courses (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
Election block: Supplementary Courses (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-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

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.

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.

Prerequisites
At least one of the courses "Advanced Stochastic Optimization" and "Large-scale Optimization" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

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.

Recommendation
It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

Annotation
The course "Introduction to Stochastic Optimization" will be offered until the summer semester 2019 as an additional option in the elective offer of the module. Thereafter, the course can only be selected in the supplementary offer.

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.

M 6.105 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: Compulsory Elective Modules (Business Administration)

Credits	Recurrence	Language	Level	Version
9	Each winter term	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".

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.

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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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 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
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 6.106 Module: Student Innovation Lab (SIL) 2 [M-WIWI-105011]

Responsible: Prof. Dr.-Ing. Sören Hohmann
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	Recurrence	Language	Level	Version
9	Each winter term	English	4	1

Mandatory			
T-ETIT-110291	Innovation Lab	9 CR	Hohmann, 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.

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.

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/.

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 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 6.107 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	Recurrence	Language	Level	Version
9	Each winter 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	5 CR	Hochstein

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.

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.

Prerequisites
none

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 6.108 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	4	2

Election block: Compulsory Elective Courses (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.

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

Prerequisites
None

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 6.109 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	4	3

Election block: Compulsory Examination (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
Election block: Electives (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-WIWI-103174	Seminar Mobility Services (Master)	3 CR	Satzger, Stryja
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

Competence Goal
See German version.

Prerequisites
None

Recommendation
None

M 6.110 Module: Urban Water Technologies [M-BGU-104448]

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

Credits	Recurrence	Language	Level	Version
9	Each summer term	English	4	1

Mandatory			
T-BGU-106600	Urban Water Infrastructure and Management	6 CR	Fuchs
T-BGU-109051	Wastewater and Storm Water Treatment Facilities for Industrial Engineers	3 CR	Fuchs, Morck

Prerequisites
None

Recommendation
None

M 6.111 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	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	4	4

Election block: Vehicle Development (at least 9 credits)			
T-MACH-105156	Vehicle Mechatronics I	3 CR	Ammon
T-MACH-105160	Fundamentals in the Development of Commercial Vehicles I	1,5 CR	Zürn
T-MACH-105161	Fundamentals in the Development of Commercial Vehicles II	1,5 CR	Zürn
T-MACH-102207	Tires and Wheel Development for Passenger Cars	3 CR	Leister
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, Xiang
T-MACH-108888	Simulation of Coupled Systems - Advance	0 CR	Geimer, Xiang

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).

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.

Prerequisites
None

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.

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.

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.

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

M 6.112 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	3

Mandatory			
T-MACH-102123	Virtual Engineering I	4 CR	Ovtcharova
Election block: Virtual Engineering A (at least 5 credits)			
T-MACH-109933	Business Administration for Engineers and IT professionals	4 CR	Sebregondi
T-MACH-102185	CATIA CAD Training Course	2 CR	Ovtcharova
T-MACH-105312	CATIA Advanced	4 CR	Ovtcharova
T-MACH-108491	Digitalization of Products, Services & Production	4 CR	Pätzold
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-106743	IoT Platform for Engineering	4 CR	Ovtcharova
T-MACH-102153	PLM-CAD Workshop	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

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 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

Prerequisites
The course *Virtual Engineering I* [2121352] is compulsory modules and must be examined.

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
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 6.113 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	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German	4	3

Mandatory			
T-MACH-102124	Virtual Engineering II	4 CR	Ovtcharova
Election block: Virtual Engineering B (at least 5 credits)			
T-MACH-109933	Business Administration for Engineers and IT professionals	4 CR	Sebregondi
T-MACH-102185	CATIA CAD Training Course	2 CR	Ovtcharova
T-MACH-105312	CATIA Advanced	4 CR	Ovtcharova
T-MACH-108491	Digitalization of Products, Services & Production	4 CR	Pätzold
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-102153	PLM-CAD Workshop	4 CR	Ovtcharova
T-MACH-106740	Virtual Engineering Lab	4 CR	Ovtcharova
T-MACH-106741	Virtual Training Factory 4.X	4 CR	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.

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

Prerequisites
keine

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 6.114 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	Recurrence	Duration	Language	Level	Version
9	Each winter term	1 semester	German/English	4	1

Mandatory			
T-CIWVT-101900	Water Chemistry and Water Technology I	6 CR	Horn
T-CIWVT-103351	Laboratory Work Water Chemistry	4 CR	Abbt-Braun, Horn

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,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water.

Prerequisites
none

Content
This module gives the basis to understand the most important methods of raw water treatment.

Therefore types and sum of water constituents and their interaction with each other and with water molecules are introduced. The effects of the different treatment and purification methods are shown

M 6.115 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	Recurrence	Duration	Level	Version
9	Each term	2 semester	4	1

Mandatory			
T-CIWVT-101901	Water Chemistry and Water Technology II	9 CR	Horn

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,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water.
- knows about the different types of water treatment and water purification methods to convert, reduce or concentrate water constituents,

Prerequisites
The Module "Water Chemistry and Water Technology I" must be passed.

Content
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: A Closer Look at Social Innovation [T-WIWI-109932]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
SS 2020	2545105	Negotiating Open Innovation	2 SWS	Seminar (S)	Beyer

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation). The grade consists of an innovation plan (comparable to an exposé) (15%), a guideline interview (25%), a presentation of the results (20%) and a seminar paper (40%).

Prerequisites
None

Recommendation
The previous attendance of the lecture Innovation Management is recommended.

Below you will find excerpts from events related to this course:

V Negotiating Open Innovation
2545105, SS 2020, 2 SWS, Language: German, Open in study portal — **Seminar (S)**

Content
In times of great challenges, it is no longer sufficient for individual experts to be responsible for innovation success. This is precisely why there is currently so much hype surrounding the topic of Open Innovation. The exchange of knowledge within and between organizations is crucial, but requires the right attitudes and decisions. This seminar examines how this can be achieved in the best possible way, depending on the objectives. By visiting two practitioners from science-economics cooperations and the company's own Startup Accelerator Programme, theory and practice are linked. Furthermore, a simulation game will take place in the last session, in which the learned will be applied. The grading is based on a group seminar work, which requires an empirical analysis and the preparation of this in the course of the semester (expose, preparation of the methodology) as well as well-informed participation.

T 7.2 Course: Advanced Empirical Asset Pricing [T-WIWI-110513]

Responsible: Jun.-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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530569	Advanced Empirical Asset Pricing	2 SWS	Lecture (V)	Thimme
WS 19/20	2530570	Übung zu Advanced Empirical Asset Pricing	1 SWS	Practice (Ü)	Thimme
Exams					
WS 19/20	7900319	Advanced Empirical Asset Pricing		Prüfung (PR)	Thimme

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. The examination is offered every semester and can be repeated at any regular examination date.
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 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

2530569, WS 19/20, 2 SWS, Language: English, Open in study portal **Lecture (V)**

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.

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 7.3 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2521533	Advanced Game Theory	2 SWS	Lecture (V)	Reiß
WS 19/20	2521534	Übung zu Advanced Game Theory	1 SWS	Practice (Ü)	Reiß
Exams					
WS 19/20	7900279	Advanced Game Theory		Prüfung (PR)	Puppe
WS 19/20	7900317	Advanced Game Theory		Prüfung (PR)	Reiß

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

2521533, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

T 7.4 Course: Advanced Information Systems [T-WIWI-110373]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101411 - Information Engineering

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2540450	Advanced Information Systems	2 SWS	Lecture (V)	Weinhardt, Mädche, Staudt
WS 19/20	2540451		1 SWS	Practice (Ü)	Mädche, Weinhardt
Exams					
WS 19/20	7900195	Advanced Information Systems		Prüfung (PR)	Weinhardt
WS 19/20	7900231	Advanced Information Systems		Prüfung (PR)	Weinhardt

Competence Certificate
Please note that the lecture will no longer be offered as of summer semester 2020. The last opportunity to take an examination is in the winter semester 2020/2021.

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation).

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-109918 - Foundations of Information Systems must not have been started.

Recommendation
None

Annotation
The course starts with a short summary of Information Systems I and II. The course is held in English.

Below you will find excerpts from events related to this course:

V Advanced Information Systems

2540450, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Lecture (V)

Literature

- Shapiro, C., Varian, H., Information Rules: A Strategic Guide to the Network Economy. Harvard Business School Press 1999.
- Stahlknecht, P., Hasenkamp, U., Einführung in die Wirtschaftsinformatik. Springer Verlag 7. Auflage, 1999.
- Wirth, H., Electronic Business. Gabler Verlag 2001.

T 7.5 Course: Advanced Lab Informatics (Master) [T-WIWI-110548]

Responsible: Professorenschaft des Fachbereichs Informatik
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	Recurrence	Version
Examination of another type	4,5	Each term	1

Events					
WS 19/20	2512301	Linked Data and the Semantic Web	3 SWS		Sure-Vetter, Acosta Deibe, Käfer, Heling
WS 19/20	2512501	Project lab Cognitive automobiles and robots	3 SWS	Practical course (P)	Zöllner
WS 19/20	2512600	Project lab Information Service Engineering	2 SWS	Practical course (P)	Sack
SS 2020	2512205	Lab Business Information Systems: Realisation of innovative services (Master)	3 SWS	Practical course (P)	Oberweis, Schiefer, Schüler, Toussaint
SS 2020	2512207	Lab Automation in Everyday Life (Master)	3 SWS	Practical course (P)	Oberweis, Forell, Frister
SS 2020	2512401	Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course (P)	Sunyaev, Sturm
SS 2020	2512403	Praktikum Blockchain und Distributed Ledger Technology (Master)	SWS	Practical course (P)	Sunyaev, Beyene, Kannengießer, Pandl
SS 2020	2512500	Project Lab Machine Learning	3 SWS	Practical course (P)	Zöllner
SS 2020	2512555	Practical lab Security, Usability and Society (Master)	3 SWS	Practical course (P)	Volkamer, Strufe, Mayer, Mossano
Exams					
WS 19/20	7900038	Linked Data and the Semantic Web		Prüfung (PR)	Sure-Vetter
WS 19/20	7900046	Sicherheit		Prüfung (PR)	Volkamer
WS 19/20	7900047	Praktikum Betriebliche Informationssysteme: Realisierung innovativer Dienste		Prüfung (PR)	Oberweis
WS 19/20	7900102	Advanced Lab Information Service Engineering		Prüfung (PR)	Sack
WS 19/20	7900107	Advanced Lab Cognitive Automobile and Robots		Prüfung (PR)	Zöllner
WS 19/20	7900115	Development of Sociotechnical Information Systems		Prüfung (PR)	Sunyaev
WS 19/20	7900116	Advanced Lab Security, Usability and Society		Prüfung (PR)	Volkamer
WS 19/20	7900187	Real-World Challenges in Data Science und Analytics		Prüfung (PR)	Sure-Vetter
SS 2020	7900020	Lab Automation in Everyday Life (Master)		Prüfung (PR)	Oberweis
SS 2020	7900086	Project Lab Machine Learning		Prüfung (PR)	Zöllner
SS 2020	7900147	Cognitive Automobiles and Robots		Prüfung (PR)	Zöllner
SS 2020	7900148	Advanced Lab in Information Systems: Realization of innovative services (Master)		Prüfung (PR)	Oberweis
SS 2020	7900172	Lab Blockchain and Distributed Ledger Technology (Master)		Prüfung (PR)	Sunyaev
SS 2020	7900173	Development of Sociotechnical Information Systems (Master)		Prüfung (PR)	Sunyaev

SS 2020	7900178	Practical lab Security, Usability and Society (Master)	Prüfung (PR)	Volkamer

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

Linked Data and the Semantic Web

2512301, WS 19/20, 3 SWS, Language: German/English, Open in study portal

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

Project lab Cognitive automobiles and robots

2512501, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

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 4.5 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.

V Project lab Information Service Engineering

2512600, WS 19/20, 2 SWS, Language: English, Open in study portal

Practical course (P)

Content
The ISE project course is based on the summer semester lecture "Information Service Engineering". Goal of the course is to work on a 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 ISEproject course can also be credited as a **seminar**.

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff.

The project course will be restricted to 15 participants.

Participation in the lecture "Information Service Engineering" (summer semester) is required.

ISE Tutor Team:

- Dr. Mehwish Alam
- M. Sc. Rima Türker
- M. Sc. Russa Biswas
- M. Sc. Fabian Hoppe
- M. Sc. Genet Asefa Gesese
- B. Sc. Tabea Tietz

V Lab Business Information Systems: Realisation of innovative services (Master)

2512205, SS 2020, 3 SWS, Language: German, Open in study portal

Practical course (P)

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.

V Lab Automation in Everyday Life (Master)

2512207, SS 2020, 3 SWS, Language: German, Open in study portal

Practical course (P)

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.

V Development of Sociotechnical Information Systems (Master)

2512401, SS 2020, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

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 2020, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

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 4.5 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.

V Practical lab Security, Usability and Society (Master)

2512555, SS 2020, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

Content
The internship "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies.

Important dates:

Kick-off: April 24th, 2020, 14: 00-15: 30 Get. 5.20 Room 3A-11.1

Final submission: TBA

Presentation: TBA

Subjects:

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.

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.

Conducting Usable Security User studies (online studies only)

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

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) .

As reported on the KIT informational page for the Corona outbreak (https://www.kit.edu/kit/25911.php), all teaching and in-person contact are forbid until new noticed. If the KIT restrictions are still in effect on the kick-off date, this will still take place at the date and time programmed, albeit in an online form.

In any case, we will inform you promptly as soon a more precise decision is reached.

T 7.6 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	Recurrence	Version
Examination of another type	4,5	Each winter term	2

Events					
WS 19/20	2512100	Security	4 SWS	Practical course (P)	Baumgart, Volkamer, Mayer, Zarei
Exams					
WS 19/20	7900046	Sicherheit		Prüfung (PR)	Volkamer

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.

Below you will find excerpts from events related to this course:

V Security

2512100, WS 19/20, 4 SWS, Language: German, Open in study portal

Practical course (P)

Content
The lab deals with the IT security of everyday utensils. Implemented security mechanisms are first theoretically investigated and put to the test with practical attacks. Finally, countermeasures and suggestions for improvement are worked out. The lab is offered within the competence center for applied security technologies (KASTEL) and is supervised by several institutes.

The success control takes the form of a final presentation, a thesis and the handing over of the developed code.

More information on https://ilias.studium.kit.edu/goto_produktiv_crs_998421.html

T 7.7 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
WS 19/20	2512551	Practical lab Security, Usability and Society	3 SWS	Practical course (P)	Volkamer, Landesberger von Antburg, Mayer
SS 2020	2512554	Practical lab Security, Usability and Society (Bachelor)	3 SWS	Practical course (P)	Volkamer, Strufe, Mayer, Mossano
Exams					
WS 19/20	7900116	Advanced Lab Security, Usability and Society		Prüfung (PR)	Volkamer
SS 2020	7900029	Practical lab Security, Usability and Society (Bachelor)		Prüfung (PR)	Volkamer

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 is expected to be offered from winter term 2018/2019.

Contents:

In the course of the programming lab, changing topics from the field of Human Factors in Security und Privacy will be worked on.

Learning goals:

The student

- can apply the basics of information security
- is able to implement appropriate measures to achieve different protection goals
- can structure a software project in the field of information security
- can use the Human Centred Security and Privacy by Design technique to develop user-friendly software
- can explain and present technical facts and the results of the programming lab in oral and written form

Below you will find excerpts from events related to this course:

V Practical lab Security, Usability and Society

2512551, WS 19/20, 3 SWS, Open in study portal — **Practical course (P)**

Content
Kick-off Meeting (compulsory attendance) on 18.10.2019 at 11:00 in room 3A-11.2

V

Practical lab Security, Usability and Society (Bachelor)

2512554, SS 2020, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

Content
The internship "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies.

Important dates:

Kick-off: April 24th, 2020, 14: 00-15: 30 Get. 5.20 Room 3A-11.1

Final submission : TBA

Presentation : TBA

Subjects:

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.

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.

Conducting Usable Security User studies (online studies only)

These topics are related to how to set up and conducting user studies of various types. This year, due to the Corona outbreak, we decided to conduct online studies only; otherwise, interviews and in lab studies would have been possible. At the end of the semester, the students present a report / paper and a talk in which they present their results.

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) .

As reported on the KIT informational page for the Corona outbreak (https://www.kit.edu/kit/25911.php), all teaching and in-person contact are forbid until new noticed. If the KIT restrictions are still in effect on the kick-off date, this will still take place at the date and time programmed, albeit in an online form.

In any case, we will inform you promptly as soon a more precise decision is reached.

T 7.8 Course: Advanced Lab User Studies in Security [T-WIWI-109271]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101628 - Emphasis in Informatics

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer 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

T 7.9 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-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2540535	Advanced Machine Learning	2 SWS	Lecture (V)	Nazemi
SS 2020	2540536	Exercise Advanced Machine Learning	1 SWS	Practice (Ü)	Nazemi

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 2020, 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 7.10 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	Recurrence	Version
Oral examination	4,5	Each winter term	2

Events					
WS 19/20	2579907	Advanced Management Accounting	4 SWS	Lecture (V)	Wouters, Riar
Exams					
WS 19/20	79-2579907-M	Advanced Management Accounting		Prüfung (PR)	Wouters

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 19/20, 4 SWS, Language: English, Open in study portal

Lecture (V)

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 7.11 Course: Advanced Management Accounting 2 [T-WIWI-110179]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Recurrence	Version
Oral examination	4,5	Each summer term	1

Events					
SS 2020	2579908	Advanced Management Accounting 2	4 SWS	Lecture / Practice (VÜ)	Wouters, Ebinger

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.

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 2

2579908, SS 2020, 4 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)

T 7.12 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2550552	Statistik für Fortgeschrittene	2 SWS	Lecture (V)	Grothe
WS 19/20	2550553	Übung zu Statistik für Fortgeschrittene	2 SWS	Practice (Ü)	Grothe, Kaplan
Exams					
WS 19/20	7900289	Advanced Statistics		Prüfung (PR)	Grothe

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4). The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Annotation
New course starting winter term 2015/2016

Below you will find excerpts from events related to this course:

V Statistik für Fortgeschrittene

2550552, WS 19/20, 2 SWS, Open in study portal — **Lecture (V)**

Literature
Skript zur Vorlesung

T 7.13 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	Recurrence	Version
Written examination	4,5	Irregular	1

Exams				
WS 19/20	7900245	Advanced Stochastic Optimization	Prüfung (PR)	Rebennack

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 7.14 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
SS 2020	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture (V)	Mitusch, Scheffel
SS 2020	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice (Ü)	Pegorari

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.15 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	Recurrence	Version
Oral examination	3	Each winter term	2

Events					
WS 19/20	2117056	Airport logistics	2 SWS	Lecture (V)	Richter
Exams					
WS 19/20	76-T-MACH-105175	Airport Logistics		Prüfung (PR)	Richter, Furmans

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

Literature
„Gepäcklogistik auf Flughäfen“ à http://www.springer.com/de/book/9783642328527

T 7.16 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2134150	Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines	2 SWS	Lecture (V)	Gohl
Exams					
WS 19/20	76-T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines		Prüfung (PR)	Koch
SS 2020	76--T-Mach-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines		Prüfung (PR)	Gohl

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 Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines

2134150, SS 2020, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Literature
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.

T 7.17 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2134134	Analysis tools for combustion diagnostics	2 SWS	Lecture (V)	Pfeil
Exams					
WS 19/20	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics		Prüfung (PR)	Koch
SS 2020	76-T-MACH-105167	Analysis Tools for Combustion Diagnostics		Prüfung (PR)	Koch

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Skript, erhältlich in der Vorlesung

T 7.18 Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2545108	Innovation Processes Live	2 SWS	Seminar (S)	Beyer

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation).

Innovation plan (exposé) (20%), Guided interviews/ quantitative survey (20%), presentation of results (20%), seminar paper (about 5 pages per person) (40%).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

T 7.19 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	Recurrence	Version
Examination of another type	9	Each term	2

Events					
SS 2020	5011006	Natural Language Processing	2 SWS	Seminar (S)	Nollmann
Exams					
WS 19/20	7400048	Application of Social Science Methods (WiWi)		Prüfung (PR)	Nollmann

T 7.20 Course: Applied Econometrics [T-WIWI-103125]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I

Type	Credits	Recurrence	Version
Written examination	4,5	Irregular	1

Exams				
WS 19/20	7900251	Applied Econometrics	Prüfung (PR)	Krüger

Competence Certificate
The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Annotation
The course is not offered regularly.

T 7.21 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2511032	Applied Informatics - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	2 SWS	Lecture (V)	Sunyaev
SS 2020	2511033	Übungen zu Angewandte Informatik - Internet Computing	1 SWS	Practice (Ü)	Sunyaev
Exams					
WS 19/20	7900004	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services		Prüfung (PR)	Sunyaev
SS 2020	7900025	Applied Informatics - Internet Computing (Registration until 13 July 2020)		Prüfung (PR)	Sunyaev

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.

By successful processing the exercises 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

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 - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services — Lecture (V)

2511032, SS 2020, 2 SWS, Language: German, Open in study portal

Content
The lecture Applied Computer Science II 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 7.22 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2595650	Artificial Intelligence in Service Systems	2 SWS	Lecture (V)	Kühl
Exams					
WS 19/20	7900331	Artificial Intelligence in Service Systems - oral		Prüfung (PR)	Satzger

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

Below you will find excerpts from events related to this course:

V Artificial Intelligence in Service Systems

2595650, WS 19/20, 2 SWS, Language: English, Open in study portal **Lecture (V)**

Content
Artificial Intelligence and the application of machine learning is becoming more and more popular to solve relevant business challenges. However, it is not only important to be familiar with precise algorithms, but rather a general understanding of the necessary steps with a holistic view—from real-world challenge to successful deployment of an AI. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. 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. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.

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. Students will be proficient with typical Python code for AI challenges.

T 7.23 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2530555	Asset Pricing	2 SWS	Lecture (V)	Uhrig-Homburg, Thimme
SS 2020	2530556	Übung zu Asset Pricing	1 SWS	Practice (Ü)	Uhrig-Homburg, Reichenbacher
Exams					
WS 19/20	7900056	Asset Pricing		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The success control takes place in form of a written examination (75 min) during the semester break (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.
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 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

2530555, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Basisliteratur

- Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

Zur Wiederholung/Vertiefung

- 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 7.24 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2520408	Auktionstheorie	2 SWS	Lecture (V)	Ehrhart
WS 19/20	2520409	Übungen zu Auktionstheorie	1 SWS	Practice (Ü)	Ehrhart
Exams					
WS 19/20	7900290	Auction Theory		Prüfung (PR)	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 19/20, 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 7.25 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	Recurrence	Version
Written examination	9	Each summer term	2

Events					
SS 2020	2150904	Automated Manufacturing Systems	6 SWS	Lecture / Practice (VÜ)	Fleischer
Exams					
WS 19/20	76-T-MACH-102162	Automated Manufacturing Systems		Prüfung (PR)	Fleischer

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 2020, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content
The lecture provides an overview of the structure and functioning of automated manufacturing systems. In the introduction chapter the basic elements for the realization of automated manufacturing systems are given. This includes:

- Drive and control technology
- Handling technology for handling work pieces and tools
- Industrial Robotics
- Quality assurance in automated manufacturing
- automatic machines, cells, centers and systems for manufacturing and assembly
- structures of multi-machine systems
- planning of automated manufacturing systems

An interdisciplinary view of these subareas enables Industry 4.0 solutions.
In the second part of the lecture, the basics are illustrated using implemented manufacturing processes for the production of automotive components (chassis and drive technology).The analysis of automated manufacturing systems for manufacturing of defined components is also included.
In the field of vehicle power train both, the automated manufacturing process for the production of the conventional internal-combustion engine and the automated manufacturing process for the production of the prospective electric power train
(electric motor and battery) are considered. In the field of car body, the focus is on the analysis of the process chain for the automated manufacturing of conventional sheet metal body parts, as well as for automated manufacturing of body components made out of
fiber-reinforced plastics.
Within tutorials, the contents from the lecture are advanced and applied to specific 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

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 7.26 Course: Automation of Discrete Event and Hybrid Systems [T-ETIT-100981]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101157 - Control Engineering II

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2303160	Automatisierung ereignisdiskreter und hybrider Systeme	2 SWS	Lecture (V)	Kluwe
Exams					
WS 19/20	7303160	Automation of Discrete Event and Hybrid Systems		Prüfung (PR)	Kluwe

Prerequisites
none

T 7.27 Course: Automotive Engineering I [T-MACH-100092]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Hans-Joachim Unrau

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Recurrence	Expansion	Language	Version
Written examination	6	Each winter term	1 terms		3

Events					
WS 19/20	2113805	Automotive Engineering I	4 SWS	Lecture (V)	Gauterin, Unrau
WS 19/20	2113809	Automotive Engineering I	4 SWS	Lecture (V)	Gauterin, Gießler
Exams					
WS 19/20	76-T-MACH-100092	Automotive Engineering		Prüfung (PR)	Unrau, Gauterin

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 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

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".

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 19/20, 4 SWS, Language: English, Open in study portal

Lecture (V)

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".

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 7.28 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	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	2113809	Automotive Engineering I	4 SWS	Lecture (V)	Gauterin, Gießler
Exams					
WS 19/20	76-T-MACH-102203	Automotive Engineering I		Prüfung (PR)	Gauterin

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 19/20, 4 SWS, Language: English, Open in study portal

Lecture (V)

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".

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 7.29 Course: Automotive Engineering II [T-MACH-102117]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Hans-Joachim Unrau

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	2114835	Automotive Engineering II	2 SWS	Lecture (V)	Unrau
SS 2020	2114855	Automotive Engineering II	2 SWS	Lecture (V)	Gießler
Exams					
WS 19/20	76-T-MACH-102117	Automotive Engineering II		Prüfung (PR)	Unrau, Gauterin
WS 19/20	76T-MACH-102117-2	Automotive Engineering II		Prüfung (PR)	Gauterin, Unrau

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.30 Course: Basics of German Company Tax Law and Tax Planning [T-WIWI-108711]

Responsible: 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2560134	Basics of German Company Tax Law and Tax Planning	3 SWS	Lecture (V)	Wigger, Gutekunst

Competence Certificate
The assessment consists of a written exam (90 min.) according to § 4 paragraph 2 Nr. 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 19/20, 3 SWS, Language: German, Open in study portal

Lecture (V)

Content
Workload:

The total workload for this course is approximately 135.0 hours. For further information see German version.

T 7.31 Course: Basics of Technical Logistics I [T-MACH-109919]

Responsible: Dr.-Ing. Martin Mittwollen
Jan Oellerich

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2117095	Basics of Technical Logistics	3 SWS	Lecture / Practice (VÜ)	Mittwollen, Oellerich
Exams					
WS 19/20	76-T-MACH-109919	Basics of Technical Logistics I		Prüfung (PR)	Mittwollen

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

2117095, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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.

Literature
Empfehlungen in der Vorlesung / Recommendations during lessons

T 7.32 Course: Basics of Technical Logistics II [T-MACH-109920]

Responsible: Maximilian Hochstein
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2100001	Basics of Technical Logistics II	3 SWS	Lecture / Practice (VÜ)	Hochstein
Exams					
WS 19/20	76-T-MACH-109920	Basics of Technical Logistics II		Prüfung (PR)	Mittwollen

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 7.33 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	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	2141864	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I	2 SWS	Lecture (V)	Guber
Exams					
WS 19/20	76-T-MACH-100966	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I		Prüfung (PR)	Guber

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

Lecture (V)

2141864, WS 19/20, 2 SWS, Language: German, Open in study portal

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 7.34 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	2142883	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II	2 SWS	Lecture (V)	Guber
Exams					
WS 19/20	76-T-MACH-100967	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II		Prüfung (PR)	Guber

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)

2142883, SS 2020, 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

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 7.35 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	2142879	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III	2 SWS	Lecture (V)	Guber
Exams					
WS 19/20	76-T-MACH-100968	BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III		Prüfung (PR)	Guber

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

Lecture (V)

2142879, SS 2020, 2 SWS, Language: German, Open in study portal

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

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 7.36 Course: Bionics for Engineers and Natural Scientists [T-MACH-102172]

Responsible: PD 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2142140	Bionics for Engineers and Natural Scientists	2 SWS	Lecture (V)	Hölscher, Greiner
Exams					
WS 19/20	76-T-MACH-102172	Bionics for Engineers and Natural Scientists		Prüfung (PR)	Hölscher

Competence Certificate
written or oral exam

Prerequisites
none

Below you will find excerpts from events related to this course:

V Bionics for Engineers and Natural Scientists

2142140, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

lectures 30 h

self study 30 h

preparation for examination 30 h

The successfull attandence of the lecture is controlled by a written examination.

Literature
Werner Nachtigall: Bionik – Grundlagen und Beispiele für Ingenieure und Naturwissenschaftler. Springer-Verlag Berlin (2002), 2. Aufl.

T 7.37 Course: Blockchains & Cryptofinance [T-WIWI-108880]

Responsible: Dr. Philipp Schuster
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-101446 - Market Engineering
M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101511 - Advanced Topics in Public Finance

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530567	Blockchains & Cryptofinance	2 SWS	Lecture (V)	Schuster, Uhrig-Homburg
WS 19/20	2530568	Übung zu Blockchains & Cryptofinance	1 SWS	Practice (Ü)	Müller
Exams					
WS 19/20	7900028	Blockchains & Cryptofinance		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations).
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 up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

Annotation
New course starting winter term 2018/2019.

T 7.38 Course: Building Laws [T-BGU-103429]

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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6241803	Baurecht	2 SWS	Lecture (V)	Miernik, Kohlhammer
Exams					
WS 19/20	8240103429	Building Laws		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.39 Course: BUS-Controls [T-MACH-102150]

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	Recurrence	Version
Oral examination	3	Each summer term	2

Events					
SS 2020	2114092	BUS-Controls	2 SWS	Lecture (V)	Geimer, Daiß, Metzger
Exams					
WS 19/20	76T-MACH-102150	BUS-Controls		Prüfung (PR)	Geimer
WS 19/20	76-T-MACH-102150	BUS-Controls		Prüfung (PR)	Geimer
SS 2020	76T-MACH-102150	BUS-Controls		Prüfung (PR)	Geimer

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
Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108889 must have been passed.

Recommendation
Basic knowledge of electrical engineering is recommended. Programming skills are also helpful.

The number of participants is limited. 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.

Annotation
The students will get an overview of the theoretic and practical functioning of different bus systems.

After the practical oriented lessons the students will be able to visualize the communication structure of different applications, design basic systems and evaluate the complexity of programming of the complete system.
Hereunto the students program in the practical orientated lessons IFM-controllers using the programming environment CoDeSys.

Content:

- Knowledge of the basics of data communication in networks
- Overview of the operating mode of current field buses
- Explicit observation of the operating mode and application areas of CAN buses
- Practical programming of an example application (hardware is provided)

Literature:

- Etschberger, K.: Controller Area Network, Grundlagen, Protokolle, Bausteine, Anwendungen; München, Wien: Carl Hanser Verlag, 2002.
- Engels, H.: CAN-Bus - CAN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

Below you will find excerpts from events related to this course:

V BUS-Controls

2114092, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content

- Knowledge of the basics of data communication in networks
- Overview of the operating mode of current field buses
- Explicit observation of the operating mode and application areas of CAN buses
- Practical programming of an example application (hardware is provided)

Basic knowledge of electrical engineering is recommended. Programming skills are also helpful.

- regular attendance: 21 hours
- self-study: 92 hours

Literature
Weiterführende Literatur:

- Etschberger, K.: Controller Area Network, Grundlagen, Protokolle, Bausteine, Anwendungen; München, Wien: Carl Hanser Verlag, 2002.
- Engels, H.: CAN-Bus - CAN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

T 7.40 Course: BUS-Controls - Advance [T-MACH-108889]

Responsible: Kevin Daiß
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	Recurrence	Version
Completed coursework	0	Each summer term	1

Exams				
WS 19/20	76-T-MACH-108889	BUS-Controls - Advance	Prüfung (PR)	Geimer
SS 2020	76-T-MACH-108889	BUS-Controls - Advance	Prüfung (PR)	Geimer

Competence Certificate
Creation of control program

Prerequisites
none

T 7.41 Course: Business Administration for Engineers and IT professionals [T-MACH-109933]

Responsible: Peter Sebregondi
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	1

Events					
WS 19/20	2122303	Business Administration for Engineers and IT professionals	2 SWS	Seminar (S)	Sebregondi
SS 2020	2122303	Business Administration for Engineers and IT professionals	2 SWS	Seminar (S)	Sebregondi
Exams					
WS 19/20	76-T-MACH-109933	Business Administration for Engineers and IT professionals		Prüfung (PR)	Sebregondi

Competence Certificate
Assessment of another type. Two presentations and six written compositions in team work. Grading: each composition 1/8 and each presentation 1/8.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Business Administration for Engineers and IT professionals

2122303, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Content
Learning content

- Competitive strategies, customer value, corporate cultures, lifecycles (technology, business, product), market leadership dynamics.
- Continuum commoditization/differentiation.
- Value chain, core and support functions.
- A company's business portfolio.
- Profit margin sensitivity.
- Profitable and non-profitable products, customers and businesses.
- Drivers of a company's value (McKinsey model), return on invested capital (ROIC), ROIC value driver tree.
- Strategic planning
- Capital investments, discounted cash flow analysis, quantifying of and dealing with risks, cost-estimating methodologies per planning stage.
- Sales, procurement/purchasing, negotiation strategies

Learning objectives

- better understand a company's business, financials and their executives/decision makers
- use the language and metrics of senior executives and hold effective conversations with them
- more effectively sell a solution's or project's operational and financial value to executives and decision makers

Literature
Understanding a company's business and financials made easy; Heinz-Peter Sebregondi (Amazon 2017)

Erfolgsfaktoren für die nachhaltige Business-Karriere: Die menschliche und die Business-Perspektive; Heinz-Peter Sebregondi (Amazon 2018)

V

Business Administration for Engineers and IT professionals

2122303, SS 2020, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

Content
Learning content

- Competitive strategies, customer value, corporate cultures, lifecycles (technology, business, product), market leadership dynamics.
- Continuum commoditization/differentiation.
- Value chain, core and support functions.
- A company's business portfolio.
- Profit margin sensitivity.
- Profitable and non-profitable products, customers and businesses.
- Drivers of a company's value (McKinsey model), return on invested capital (ROIC), ROIC value driver tree.
- Strategic planning
- Capital investments, discounted cash flow analysis, quantifying of and dealing with risks, cost-estimating methodologies per planning stage.
- Sales, procurement/purchasing, negotiation strategies

Learning objectives

- better understand a company's business, financials and their executives/decision makers
- use the language and metrics of senior executives and hold effective conversations with them
- more effectively sell a solution's or project's operational and financial value to executives and decision makers

Literature
Understanding a company's business and financials made easy; Heinz-Peter Sebregondi (Amazon 2017)

Erfolgsfaktoren für die nachhaltige Business-Karriere: Die menschliche und die Business-Perspektive; Heinz-Peter Sebregondi (Amazon 2018)

T 7.42 Course: Business Administration in Information Engineering and Management [T-WIWI-102886]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Competence Certificate
The lecture is no longer offered.

Prerequisites
None

Recommendation
Basic knowledge from Operations Research (linear programming) and from decision theory are expected.

T 7.43 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2540466	Business Data Analytics: Application and Tools	2 SWS	Lecture (V)	Dann, Staudt, Haubner
SS 2020	2540467	Excercise Business Data Analytics: Application and Tools	1 SWS	Practice (Ü)	Jaquart

Competence Certificate
The assessment is carried out by a written examination (60 minutes) and a written elaboration. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Prerequisites
None

Recommendation
Knowledge of object-oriented programming and statistics is helpful.

Annotation
Course name until winter semester 2018/2019 "Applied Analytics with Open Source Tools" (T-WIWI-108438)

Below you will find excerpts from events related to this course:

V Business Data Analytics: Application and Tools

2540466, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

T 7.44 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540484	Business Data Strategy	2 SWS	Lecture (V)	Weinhardt
WS 19/20	2540485	Übung zu Business Data Strategy	1 SWS	Practice (Ü)	Weinhardt, Knierim
Exams					
WS 19/20	7900226	Business data strategy		Prüfung (PR)	Weinhardt
WS 19/20	7900234	Business Data Strategy		Prüfung (PR)	Weinhardt

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 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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.

T 7.45 Course: Business Dynamics [T-WIWI-102762]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets
M-WIWI-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540531	Business Dynamics	2 SWS	Lecture (V)	Geyer-Schulz, Glenn
WS 19/20	2540532	Exercise Business Dynamics	1 SWS	Practice (Ü)	Geyer-Schulz, Glenn
Exams					
WS 19/20	7979777	Business Dynamics		Prüfung (PR)	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

Recommendation
None

Below you will find excerpts from events related to this course:

V Business Dynamics

2540531, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
John D. Sterman. Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill, 2000.

T 7.46 Course: Business Intelligence Systems [T-WIWI-105777]

Responsible: Prof. Dr. Alexander Mädche
Mario Nadj
Peyman Toreini

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	Recurrence	Version
Examination of another type	4,5	Each winter term	2

Events					
WS 19/20	2540422	Business Intelligence Systems	3 SWS	Lecture (V)	Mädche, Nadj
Exams					
WS 19/20	7900224	Business Intelligence Systems		Prüfung (PR)	Mädche

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

2540422, WS 19/20, 3 SWS, Language: English, Open in study portal

Lecture (V)

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 analytic 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.

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 7.47 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-101410 - Business & Service Engineering
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-102806 - Service Innovation, Design & Engineering

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2540456	Internet Business Models	2 SWS	Lecture (V)	Peukert, Dann, Dorner
SS 2020	2540457	Übungen zu Geschäftsmodelle im Internet: Planung und Umsetzung	1 SWS	Practice (Ü)	Peukert, Dann
Exams					
WS 19/20	7900260	Business Models in the Internet: Planning and Implementation (Nachklausur aus dem SS19)		Prüfung (PR)	Weinhardt

Competence Certificate
Please note that in the summer semester 2020 the exam will only be offered to students who have completed the semester performance but have not yet taken the exam. From summer semester 2021 the exam will be offered again regularly.

Success is monitored through ongoing elaborations and presentations of tasks and a written exam (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.

Successful participation in the excercises is a prerequisite for admission to the written examination.

Prerequisites
None

Recommendation
None

Annotation
Please note that the lecture will not be offered in summer semester 2020 due to the research semester of Prof. Weinhardt.

Below you will find excerpts from events related to this course:

V Internet Business Models

2540456, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Wird in der Vorlesung bekannt gegeben.

T 7.48 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)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2545007	Business Planning for Founders (ENTECH)	2 SWS	Seminar (S)	Wohlfeil, Bauman
SS 2020	2545007	Business Planning for Founders	2 SWS	Seminar (S)	Kleinn, Mohammadi, Terzidis
Exams					
WS 19/20	7900023	Business Planning for Founders		Prüfung (PR)	Terzidis
SS 2020	7900040	Business Planning		Prüfung (PR)	Terzidis

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 (ENTECH)

2545007, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The seminar introduces students to the basic concepts of business planning for entrepreneurs. On the one hand, this involves concepts for the concretisation of business ideas (business modelling, market potential assessment, resource planning, etc.) and on the other hand, the preparation of an implementable business plan (with or without VC financing). In the course of the seminar, the students are familiarized with methods of further developing patents and business ideas into a more concrete business plan and formulating them in a business plan.

V Business Planning for Founders

2545007, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The seminar introduces students to the basic concepts of business planning for entrepreneurs. On the one hand, this involves concepts for the concretisation of business ideas (business modelling, market potential assessment, resource planning, etc.) and on the other hand, the preparation of an implementable business plan (with or without VC financing). In the course of the seminar, the students are familiarized with methods of further developing patents and business ideas into a more concrete business plan and formulating them in a business plan.

T 7.49 Course: Business Planning for Founders - EUCOR [T-WIWI-110389]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
WS 19/20	2545020	Business Planning for Founders (EUCOR Edition)	2 SWS	Seminar (S)	Terzidis
Exams					
WS 19/20	7900274	Business Planning for Founders - EUCOR		Prüfung (PR)	Terzidis

Competence Certificate
Alternative exam assessment.

Prerequisites
The course can only be combined with the course "International Selling - EUCOR" to be completed. The course is a combination of 6 ECTS, 3 ECTS per part. The combination can be credited either in the Entrepreneurship module or in the Sales Management module.

Below you will find excerpts from events related to this course:

V Business Planning for Founders (EUCOR Edition)

2545020, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The seminar introduces students to basic concepts of business planning for entrepreneurs. This involves concepts for the description of business opportunities (problem, solution, target group, value proposition etc.), the evaluation of the opportunity (market potential, competitor analysis, feasibility etc.) as well as the creation of an executable business plan (team set-up, product development, market entry approach, marketing approach, financial planning).

Organizational Information:

- An application is required to participate in this event. The registration for the two courses "Business Planning for Founders - EUCOR" (3 ECTS) and "International Selling - EUCOR" (3 ECTS) is open now at Wiwi-Portal.
- Please note that this course "Business Planning for Founders - EUCOR" (3 ECTS) and the course "International Selling – EUCOR " (3 ECTS) can only be taken together (a total of 6 ECTS). In combination with the compulsory lecture "Entrepreneuership" (3 ECTS) the module "Entrepreneurship" is completed (or in combination with "Sales Management and Retailing" (3 ECTS) the module "Sales Management").
- Both courses will be held in English.
- This event is also open to participants of the EUCOR programme.

Further information about the courses can be found in the module handbook (https://www.wiwi.kit.edu/lehreMHB.php) and in the course catalog:
Business Planning for Founders
International Selling

If you have any questions, please contact the following persons:
Business Planning for Founders: andreas.kleinn@kit.edu
International Selling: anika.honold@kit.edu

Course Dates and Locations:

- Business Planning for Founders:
  Wednesday, January 22, 2020, 1 pm - 6 pm
  Thursday, January 23, 2020, 9 am - 1 pm
  20.21, Raum 115
- International Selling:
  Thursday, January 23, 2020, 2 pm - 7 pm
  Friday, January 24, 2020, 10 am - 4 pm
  20.21, Raum 115
- Both courses will be continued from March 18 to March 20, 2020 at the EM Strasbourg in France. Accommodation and travel expenses will be covered.

Learning Objectives:

Students will be familiarized with methods of opportunity identification (including technology push opportunities), opportunity evaluation and business planning for a startup. In addition, they will work on a project in an international team and build the corresponding soft skills.

Literature
Osterwalder, Alexander; Pigneur, Yves (2013): Business model generation. A handbook for visionaries, game changers, and challengers. New York: Wiley&Sons.

Aulet, Bill (2013): Disciplined Entrepreneurship. 24 Steps to a Successful Startup. Hoboken: Wiley.

Ulwick, Anthony W. (2016): Jobs to be done. Theory to practice: Idea Bite Press.

Terzidis, Orestis; Vogel, Leonid (2018): A Unified Model of the Technology Push Process and Its Application in a Workshop Setting. In André Presse, Orestis Terzidis (Eds.): Technology Entrepreneurship: Insights in New Technology-Based Firms, Research Spin-Offs and Corporate Environments. Cham: Springer International Publishing, pp. 111–135.

T 7.50 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511210	Business Process Modelling	2 SWS	Lecture (V)	Oberweis
WS 19/20	2511211	Exercise Business Process Modelling	1 SWS	Practice (Ü)	Oberweis, Schüler, Schreiber
Exams					
WS 19/20	7900015	Business Process Modelling		Prüfung (PR)	Oberweis
SS 2020	7900047	Business Process Modelling (Registration until 13 July 2020)		Prüfung (PR)	Oberweis

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 19/20, 2 SWS, Language: German, Open in study portal **Lecture (V)**

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 7.51 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2530299	Business Strategies of Banks	2 SWS	Lecture (V)	Müller
Exams					
WS 19/20	7900064	Business Strategies of Banks		Prüfung (PR)	Müller, Ruckes

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Business Strategies of Banks

2530299, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur:

- Ein Skript wird im Verlauf der Veranstaltung kapitelweise ausgeteilt.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2014, Bankbetriebslehre, 6. Auflage, Springer

T 7.52 Course: Case Studies in Sales and Pricing [T-WIWI-102834]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each winter term	3

Events					
WS 19/20	2572182	Case Studies in Sales and Pricing	1 SWS	Block (B)	Klarmann, Assistenten

Competence Certificate
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a group presentation with a subsequent round of questions totalling 30 minutes.

Prerequisites
None

Recommendation
None

Annotation
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the Marketing and Sales Research Group (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 Case Studies in Sales and Pricing

2572182, WS 19/20, 1 SWS, Language: German/English, Open in study portal **Block (B)**

Content
Students work in groups on case studies from the field of sales and pricing. The case studies contain quantitative calculations in the context of sales and pricing as well as tasks which are to be solved by logical reasoning. When solving the case studies, theoretical sales and pricing content is applied to practical problems. Finally, the results are presented by the group and discussed.

Students

- are able to work on a case study in the field of sales and pricing on their own
- are able to apply quantitative calculations on a case study in the field of sales and pricing
- are able to collect information and data beyond the case study description and make use of them for solving their tasks
- are able to apply theories from related lectures to a practical example
- are able to present their results in a a structured and concise manner
- are able to organize their teamwork and collaborate in teams

Total work load for 1.5 ECTS: ca. 45 hours

- The final presentations can be held in German or English.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter 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 winter term starts.
- Please note that only one of the 1.5-ECTS courses 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 in the respective module to all students. Participation in a specific course cannot be guaranteed.

Literature

Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.53 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2545105	Case studies seminar: Innovation management	2 SWS	Seminar (S)	Weissenberger-Eibl
Exams					
WS 19/20	7900237	Case Studies Seminar: Innovation Management		Prüfung (PR)	Weissenberger-Eibl

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 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

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 automotive 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 7.54 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	Recurrence	Version
Examination of another type	4	Each term	1

Events					
WS 19/20	2123380	Advanced CATIA	3 SWS	Project (PRO)	Ovtcharova, Mitarbeiter
SS 2020	2123380	CATIA advanced	3 SWS	Project (PRO)	Ovtcharova, Mitarbeiter

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 19/20, 3 SWS, Language: German/English, Open in study portal

Project (PRO)

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.

Literature
Keine / None

V CATIA advanced

2123380, SS 2020, 3 SWS, Language: German/English, Open in study portal

Project (PRO)

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.

Literature
Keine / None

T 7.55 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	Recurrence	Version
Completed coursework (practical)	2	Each term	2

Events					
WS 19/20	2123358	CATIA CAD training course	2 SWS	Practical course (P)	Ovtcharova, Mitarbeiter
SS 2020	2123358	CATIA CAD training course	3 SWS	Practical course (P)	Ovtcharova, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-102185	CATIA CAD Training Course		Prüfung (PR)	Ovtcharova

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 19/20, 2 SWS, Language: German, Open in study portal

Practical course (P)

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.

Literature
Praktikumskript

V

CATIA CAD training course

2123358, SS 2020, 3 SWS, Language: German, Open in study portal

Practical course (P)

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.

Literature
Praktikumskript

T 7.56 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2126730	Ceramics Processing	2 SWS	Lecture (V)	Binder
Exams					
WS 19/20	76-T-MACH-102182	Ceramic Processing Technology		Prüfung (PR)	Binder

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

Below you will find excerpts from events related to this course:

V Ceramics Processing

2126730, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
W. Kollenberg: Technische Keramik, Vulkan Verlag 2010.

M. N. Rahaman: Ceramic Processing, CRC Taylor & Francis, 2007.

D.W. Richerson: Modern ceramic engineering, CRC Taylor & Francis, 2006.

A. G. King: Ceramic Technology and Processing, William Andrew, 2002.

T 7.57 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2550494	Challenges in Supply Chain Management	3 SWS	Lecture (V)	Mohr

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 2020, 3 SWS, Language: English, Open in study portal

Lecture (V)

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.

Literature
Wird in Abhängigkeit vom Thema in den Projektteams bekanntgegeben.

T 7.58 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	6232806	Eigenschaften von Verkehrsmitteln	2 SWS	Lecture (V)	Vortisch
Exams					
WS 19/20	8240106609	Characteristics of Transportation Systems		Prüfung (PR)	Vortisch

Prerequisites
None

Recommendation
None

Annotation
None

T 7.59 Course: Combustion Engines I [T-MACH-102194]

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

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	2133113	Combustion Engines I	4 SWS	Lecture / Practice (VÜ)	Koch
Exams					
WS 19/20	76-T-MACH-102194	Combustion Engines I		Prüfung (PR)	Kubach, Koch
SS 2020	76-T-MACH-102194	Combustion Engines I		Prüfung (PR)	Koch, Kubach

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Combustion Engines I

2133113, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content
Introduction, History, Concepts
Working Principle and Applications
Characteristic Parameters
Engine Parts
Drive Train
Fuels
Gasoline Engines
Diesel Engines
Exhaust Gas Aftertreatment

T 7.60 Course: Combustion Engines II [T-MACH-104609]

Responsible: Dr.-Ing. Rainer Koch
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2020	2134151	Combustion Engines II	3 SWS	Lecture / Practice (VÜ)	Koch
Exams					
WS 19/20	76-T-MACH-104609	Combustion Engines II		Prüfung (PR)	Kubach, Koch
SS 2020	76-T-MACH-104609	Combustion Engines II		Prüfung (PR)	Koch, Kubach

Competence Certificate
oral examination, duration: 25 minutes, no auxiliary means

Prerequisites
none

Recommendation
Fundamentals of Combustion Engines I helpful

Below you will find excerpts from events related to this course:

V Combustion Engines II

2134151, SS 2020, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

T 7.61 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	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2311616	Communication Systems and Protocols	2 SWS	Lecture (V)	Becker, Becker
SS 2020	2311618	Tutorial for 2311616 Communication Systems and Protocols	1 SWS	Practice (Ü)	Nidhi
Exams					
WS 19/20	7311616	Communication Systems and Protocols		Prüfung (PR)	Becker

Prerequisites
none

T 7.62 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	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2561204	Competition in Networks	2 SWS	Lecture (V)	Mitusch
WS 19/20	2561205	Übung zu Wettbewerb in Netzen	1 SWS	Practice (Ü)	Wisotzky, Mitusch, Corbo
Exams					
WS 19/20	7900292	Competition in Networks		Prüfung (PR)	Mitusch

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 7.63 Course: Computational Economics [T-WIWI-102680]

Responsible: Dr. rer. nat. 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	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2590458	Computational Economics	2 SWS	Lecture (V)	Shukla
WS 19/20	2590459	Excercises to Computational Economics	1 SWS	Practice (Ü)	Shukla
Exams					
WS 19/20	7900005	Computational Economics		Prüfung (PR)	Shukla
SS 2020	7900030	Computational Economics (Registration until 13 July 2020)		Prüfung (PR)	Shukla

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). 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). The bonus only applies to the first and second exam of the semester in which it was obtained.

Prerequisites
None

Annotation
The credits have been changed to 5 starting summer term 2016.

Below you will find excerpts from events related to this course:

V Computational Economics

2590458, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

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 7.64 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	Recurrence	Version
Written examination	6	Each winter term	3

Events					
WS 19/20	2500015	Computational Risk and Asset Management	4 SWS	Lecture (V)	Ulrich
Exams					
WS 19/20	7900320	Computational Risk and Asset Management		Prüfung (PR)	Ulrich

Competence Certificate
The assessment consists of a written exam (90 minutes) according to §4(2) of the examination regulation.

Recommendation
Good knowledge of statistics and first programming experience with Python is recommended.

Below you will find excerpts from events related to this course:

V Computational Risk and Asset Management

2500015, WS 19/20, 4 SWS, Language: English, Open in study portal

Lecture (V)

Content
The aim of this course is to master real-world challenges of computational risk and asset management and provide students with a skill set to incorporate different portfolio objectives into the investment process. It enables students to solve such challenges independently in Python.

The course covers several topics, among them:

Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization

Return Densities: Forecasting with Traditional and Machine Learning Approaches, Monte Carlo Simulation

Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor

Multi-Asset Valuation: DCF Approach, No-Arbitrage and Ito Calculus

The total workload for this course is approximately 180 hours.

Students will build up on the statistics and finance knowledge from their Bachelors program to learn about to automatize modern quant portfolio strategies. Students learn about advanced topics which are relevant for a realistic, real-world asset and risk management process.

T 7.65 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	Version
Completed coursework	0	1

Events					
WS 19/20	5011009	Data Science for AI	2 SWS	Course (Ku)	Nollmann
Exams					
WS 19/20	7400353	Computer Aided Data Analysis		Prüfung (PR)	Nollmann

T 7.66 Course: Computer Contract Law [T-INFO-102036]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2411604	Computer Contract Law	2 SWS	Lecture (V)	Bartsch
Exams					
WS 19/20	7500065	Computer Contract Law		Prüfung (PR)	Dreier, Matz
SS 2020	7500066	Computer Contract Law		Prüfung (PR)	Dreier, Matz

Below you will find excerpts from events related to this course:

V Computer Contract Law

2411604, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.67 Course: Constitution and Properties of Protective Coatings [T-MACH-105150]

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

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2177601	Constitution and Properties of Protective Coatings	2 SWS	Lecture (V)	Ulrich
Exams					
WS 19/20	76-T-MACH-105150	Constitution and Properties of Protective Coatings		Prüfung (PR)	Ulrich

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.68 Course: Constitution and Properties of Wearresistant Materials [T-MACH-102141]

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

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2020	2194643	Constitution and Properties of Wear resistant materials	2 SWS	Lecture (V)	Ulrich
Exams					
WS 19/20	76-T-MACH-102141	Constitution and Properties of Wearresistant Materials		Prüfung (PR)	Ulrich

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.69 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	6243701	Maschinentechnik	2 SWS	Lecture (V)	Gentes, Dörfler
Exams					
WS 19/20	8240101845	Construction Equipment		Prüfung (PR)	Gentes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.70 Course: Control of Linear Multivariable Systems [T-ETIT-100666]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101157 - Control Engineering II

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	2303177	Control of Linear Multivariable Systems	3 SWS	Lecture (V)	Kluwe
WS 19/20	2303179	Control of Linear Multivariable Systems (Tutorial to 2303177)	1 SWS	Practice (Ü)	Köpf
Exams					
WS 19/20	7303177	Control of Linear Multivariable Systems		Prüfung (PR)	Kluwe

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 7.71 Course: Control Technology [T-MACH-105185]

Responsible: Christoph Gönnheimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	2

Events					
SS 2020	2150683	Control Technology	2 SWS	Lecture (V)	Gönnheimer
Exams					
WS 19/20	76-T-MACH-105185	Control Technology		Prüfung (PR)	Gönnheimer

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Control Technology

2150683, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.72 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	Recurrence	Version
Written examination	4,5	Irregular	1

Exams				
WS 19/20	7900009_WS1920_HK	Convex Analysis	Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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 7.73 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
WS 19/20	2119100	Fördertechnik und Logistiksysteme	SWS	Seminar (S)	Furmans, Pagani
SS 2020	2119100	Fördertechnik und Logistiksysteme	SWS	Seminar (S)	Furmans, Pagani
Exams					
WS 19/20	76-T-MACH-102135	Conveying Technology and Logistics		Prüfung (PR)	Furmans
SS 2020	76-T-MACH-102135	Conveying Technology and Logistics		Prüfung (PR)	Furmans

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, SS 2020, SWS, Open in study portal **Seminar (S)**

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. The students can work on the topic either alone or in a group work. At the end the results are presented and discussed with a final presentation. The prepare the work for the seminar an introductory event is scheduled at the beginning.

T 7.74 Course: Copyright [T-INFO-101308]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24121	Copyright	2 SWS	Lecture (V)	Dreier
Exams					
WS 19/20	7500064	Copyright		Prüfung (PR)	Dreier, Matz
SS 2020	7500064	Copyright		Prüfung (PR)	Dreier, Matz

T 7.75 Course: Corporate Compliance [T-INFO-101288]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2400087	Corporate Compliance	2 SWS	Lecture (V)	Herzig
Exams					
WS 19/20	7500063	Corporate Compliance		Prüfung (PR)	Dreier, Matz
SS 2020	7500063	Corporate Compliance		Prüfung (PR)	Dreier, Matz

T 7.76 Course: Corporate Financial Policy [T-WIWI-102622]

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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2530214	Corporate Finance Policy	2 SWS	Lecture (V)	Ruckes
SS 2020	2530215	Übungen zu Corporate Finance Policy	1 SWS	Practice (Ü)	Ruckes, Hoang
Exams					
WS 19/20	7900058	Corporate Financial Policy		Prüfung (PR)	Ruckes

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 Corporate Finance Policy

2530214, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur

Tirole, J. (2006): The Theory of Corporate Finance. Princeton University Press.

T 7.77 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
WS 19/20	2530220		SWS	Practice (Ü)	Ruckes, Hoang, Silbereis
SS 2020	2530218	Corporate Risk Management	SWS	Lecture (V)	Ruckes, Hoang
SS 2020	2530219	Übung zu Corporate Risk Management	SWS	Practice (Ü)	Silbereis, Ruckes, Hoang
Exams					
WS 19/20	7900136	Corporate Risk Management		Prüfung (PR)	Ruckes
SS 2020	7900259	Corporate Risk Management		Prüfung (PR)	Ruckes

Competence Certificate
Please note that the lecture will not be offered in summer semester 2020.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. 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.

Prerequisites
None

Recommendation
None

Annotation
The course will exceptionally be held in the winter semester 2019/2020. Usually, however, the event takes place as a block course in the summer semester.

Below you will find excerpts from events related to this course:

V 2530220, WS 19/20, SWS, Language: English, Open in study portal **Practice (Ü)**

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach*. Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006.

V **Corporate Risk Management** **Lecture (V)**
2530218, SS 2020, SWS, Language: English, Open in study portal

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach*. Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006.

V

Übung zu Corporate Risk Management

2530219, SS 2020, SWS, Language: English, Open in study portal

Practice (Ü)

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach*. Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006.

T 7.78 Course: Credit Risk [T-WIWI-102645]

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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530565	Credit Risk	3 SWS	Lecture / Practice (VÜ)	Uhrig-Homburg, Mitarbeiter
Exams					
WS 19/20	7900055	Credit Risk		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The examination is offered every semester and can be repeated at every regular examination date.
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 up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
Knowledge from the course "Derivatives" is very helpful.

Annotation
See German version.

Below you will find excerpts from events related to this course:

V Credit Risk

2530565, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

The objective of this course is to become familiar with the credit markets and the credit risk indicators like ratings, default probabilities and credit spreads. The students learn about the components of credit risk (e.g. default time and default rate) and quantify these in different theoretical models to price credit derivatives.

The total workload for this course is approximately 135.0 hours. For further information see German version.

The assessment consists of a written exam following §4, Abs. 2, 1.

- Lando, D., Credit risk modeling: Theory and Applications, Princeton Univ. Press, (2004).
- Uhrig-Homburg, M., Fremdkapitalkosten, Bonitätsrisiken und optimale Kapitalstruktur, Beiträge zur betriebswirtschaftlichen Forschung 92, Gabler Verlag, (2001).

Elective literature:

- Bluhm, C., Overbeck, L., Wagner, C. , Introduction to Credit Risk Modelling, 2nd Edition, Chapman & Hall, CRC Financial Mathematics Series, (2010).
- Duffie, D., Singleton, K.J., Credit Risk: Pricing, Measurement and Management, Princeton Series of Finance, Prentice Hall, (2003).

Literature

- Lando, D., Credit risk modeling: Theory and Applications, Princeton Univ. Press, (2004).
- Uhrig-Homburg, M., Fremdkapitalkosten, Bonitätsrisiken und optimale Kapitalstruktur, Beiträge zur betriebswirtschaftlichen Forschung 92, Gabler Verlag, (2001).

Weiterführende Literatur:

- Bluhm, C., Overbeck, L., Wagner, C. , Introduction to Credit Risk Modelling, 2nd Edition, Chapman & Hall, CRC Financial Mathematics Series, (2010).
- Duffie, D., Singleton, K.J., Credit Risk: Pricing, Measurement and Management, Princeton Series of Finance, Prentice Hall, (2003).

T 7.79 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	Recurrence	Version
Examination of another type	4,5	Each winter term	4

Events					
WS 19/20	2511400	Critical Information Infrastructures	2 SWS	Lecture (V)	Sunyaev, Dehling, Lins
WS 19/20	2511401	Exercises to Critical Information Infrastructures	1 SWS	Practice (Ü)	Sunyaev, Dehling, Lins
Exams					
WS 19/20	7900067	Critical Information Infrastructures		Prüfung (PR)	Sunyaev

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.

Prerequisites
None.

Annotation
New lecture from winter semester 2018/2019.

Below you will find excerpts from events related to this course:

V Critical Information Infrastructures

2511400, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The course critical information infrastructures introduces students to the world of these complex sociotechnical systems that permeate societies on a global scale. Students will learn to handle the complexities involved in the design, development, operation and evaluation of critical information infrastructures. In the beginning of the lecture, critical information infrastructures will be introduced on a general level.

The following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. Students will work (in a group) on a selected case and have to write a seminar paper.

There will be a short introduction to the topics for the course paper on the following topic areas. In addition, it will be possible to propose your own topics as a group in the topic areas:

- **Blockchain**
- **Cloud Computing**
- **Digital Health**
- **Fog Computing**
- **Information Privacy**
- **Certification of critical IT-Services**

In addition to introductions to the topics, an online course is also offered to introduce students to scientific writing. This means to learn how to quote, how a scientific work is structured, and in which form the results of one's research are presented. Since we offer topics in this course that also correspond to the research interests in our research group, there may also be the opportunity to work on the topics in more depth in the course of a final thesis. Students can choose a topic from a variety of topics of the topics presented, and write a course paper in a group of four students.

Learning objectives:

Students know concepts and technologies relevant for the design and reliable operation of critical information infrastructures and can leverage them to develop solutions for real-world challenges.

Notes:

Please note the changed course structure. The course will be held as a block course.

The number of participants is limited. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/3073

Please make sure that your are available at the following dates if you would like to attend the course:

- Introduction: 4 dates on which you have to participate
  - 17.10.2019, 11.30 to 13.00: Foundations of Critical Information Infrastructures. (Geb. 05.20, R1C-02)
  - 24.10.2019, 11.30 to 13.00: Introduction to topics (Geb. 05.20, R1C-02)
  - 31.10.2019: 11.30 - 13.00: Socio-Technical/Socio-Material Information Systems & Design Science Research (Geb. 05.20, R1C-02)
  - 07.11.2019, 11.30 to 13.00: The Critical Information Infrastructures Landscape (Geb. 05.20, R1C-02)
- Intermediate presentations with compulsory attendance: 13.12.2019, 10am to 4pm (Geb. 05.20, R1C-02). Exact times will be announced later.
- Final presentations with compulsory attendance: 07.02.2020, 10am to 4pm (Geb. 05.20, R1C-02). Exact times will be announced later.
- Submission of the course paper: Expected on 02.02.2019. Final date will be announced in the course.

Further information on the course structure will be announced in the first session. Depending on the number of participants the individual sessions can have a shorter duration.

The meetings will take place at the Institute AIFB, KIT Campus South, Kollegiengebäude am Kronenplatz (Geb. 05.20) in Kaiserstr. 89.

The number of participants is limited to 24 students. The registration period is from 31.08.2019 to 29.09.2019. Participation slots are expected to be allocated on 01.10.2019 and must be accepted by the student by 06.10.2019. If the slot is not accepted, the free places will be offered to the students in the waiting list.

If you have any questions regarding this registration, please contact sebastian.lins@kit.edu or dehling@kit.edu.

T 7.80 Course: Current Issues in Innovation Management [T-WIWI-102873]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation).

Prerequisites
None

Recommendation
None

Annotation
Please note that the seminars we offer vary from semester to semester. Information about the currently offered seminars can be found in the Wiwi-Portal and on the iTM Website.

T 7.81 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	Recurrence	Version
Examination of another type	4	Each term	2

Events					
WS 19/20	2143873	Actual topics of BioMEMS	2 SWS	Seminar (S)	Guber
SS 2020	2143873	Actual topics of BioMEMS	2 SWS	Seminar (S)	Guber
Exams					
WS 19/20	76-T-MACH-102176	Current Topics on BioMEMS		Prüfung (PR)	Guber

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 19/20, 2 SWS, Language: German, Open in study portal

V **Actual topics of BioMEMS** **Seminar (S)**
2143873, SS 2020, 2 SWS, Language: German, Open in study portal

T 7.82 Course: Data Mining and Applications [T-WIWI-103066]

Responsible: Rheza Nakhaeizadeh
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	Recurrence	Version
Oral examination	4,5	Each summer term	2

Events					
SS 2020	2520375	Data Mining and Applications	2/4 SWS	Lecture (V)	Nakhaeizadeh

Competence Certificate

- Conduction of a larger emprical study in groups
- reporting of milestones
- final presentation (app. 45 minutes)

Prerequisites
None

Below you will find excerpts from events related to this course:

V Data Mining and Applications

2520375, SS 2020, 2/4 SWS, Language: German, Open in study portal

Lecture (V)

Content
Learning objectives:

Students

- know the definition of Data Mining
- are familiar with the CRISP-DM
- are familiar with the most important Data Mining Algorithms like Decision Tree, K-Means, Artificial Neural Networks, Association Rules, Regression Analysis
- will be able to use a DM-Tool

Content:

Part one: Data Mining:

What is Data Mining?; History of Data Mining; Conferences and Journals on Data Mining; Potential Applications; Data Mining Process; Business Understanding; Data Understanding; Data Preparation; Modeling; Evaluation; Deployment; Interdisciplinary aspects of Data Mining; Data Mining tasks; Data Mining Algorithms (Decision Trees, Association Rules, Regression, Clustering, Neural Networks); Fuzzy Mining; OLAP and Data Warehouse; Data Mining Tools; Trends in Data Mining

Part two: Examples of application of Data Mining

Success parameters of Data Mining Projects; Application in industry; Application in Commerce

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

U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, R. Uthurusamy, editors, Advances in Knowledge Discovery and Data Mining, AAAI/MIT Press, 1996 (order online from Amazon.com or from MIT Press).

Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016 , 2006.

David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000

Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.

Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367

Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.

Ian Witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070 , 2005.

T 7.83 Course: Data Protection by Design [T-INFO-108405]

Responsible: PD Dr. Oliver Raabe
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	2400052	Data protection by design	2 SWS	Lecture (V)	Raabe, Werner
Exams					
WS 19/20	7500071	Data Protection by Design		Prüfung (PR)	Raabe

T 7.84 Course: Data Protection Law [T-INFO-101303]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	24018	Datenschutzrecht	2 SWS	Lecture (V)	Barczak
Exams					
WS 19/20	7500162	Data Protection Law		Prüfung (PR)	Barczak
SS 2020	7500083	Data Protection Law		Prüfung (PR)	Eichenhofer

T 7.85 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511202	Database Systems and XML	2 SWS	Lecture (V)	Oberweis
WS 19/20	2511203	Exercises Database Systems and XML	1 SWS	Practice (Ü)	Oberweis, Fritsch, Schüler
Exams					
WS 19/20	7900007	Database Systems and XML		Prüfung (PR)	Oberweis
SS 2020	7900046	Database Systems and XML (Registration until 13 July 2020)		Prüfung (PR)	Oberweis

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 Database Systems and XML

2511202, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 7.86 Course: Decentrally Controlled Intralogistic Systems [T-MACH-105230]

Responsible: Prof. Dr.-Ing. Kai Furmans
Maximilian Hochstein

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Recurrence	Version
Completed coursework	4	Each term	3

Events					
WS 19/20	2117084	Decentrally controlled intralogistic systems	2 SWS	Practical course (P)	Furmans, Hochstein
SS 2020	2117084	Decentrally controlled intralogistic systems	2 SWS	Practical course (P)	Furmans, Hochstein, Markert
Exams					
WS 19/20	76-T-MACH-105230	Decentrally Controlled Intralogistic Systems		Prüfung (PR)	Furmans

Competence Certificate
Certificate by colloquium with presentation

Prerequisites
None

Below you will find excerpts from events related to this course:

V Decentrally controlled intralogistic systems

2117084, WS 19/20, 2 SWS, Language: German, Open in study portal

Practical course (P)

Content
Proof:

- Certificate by colloquium with presentation

Note:

- Number of participants limited
- Participants will be selected
- One course during summer semester in english
- 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
- 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 decentraliced controlled intralogistic systems, choose appropriate system components and models and finally proof the function by using experiments.

Effort:

- Regular attendance: 10 hours
- Self-study: 80 hours (workplace is provided)

Dates and further information see homepage

Literature
keine

V **Decentrally controlled intralogistic systems** **Practical course (P)**
2117084, SS 2020, 2 SWS, Language: German, Open in study portal

Literature
keine

T 7.87 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2530550	Derivatives	2 SWS	Lecture (V)	Uhrig-Homburg, Thimme
SS 2020	2530551	Übung zu Derivate	1 SWS	Practice (Ü)	Uhrig-Homburg, Eska
Exams					
WS 19/20	7900051	Derivatives		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment takes place in the form of a written examination (75 minutes) according to §4(2), 1 SPO. The examination takes place during the semester break. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the excercises. 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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Weiterführende Literatur:
Cox/Rubinstein (1985): Option Markets, Prentice Hall

T 7.88 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2113079	Design and Development of Mobile Machines	2 SWS	Lecture (V)	Geimer, Siebert, Lehr, Geiger
Exams					
WS 19/20	76-T-MACH-105311	Design and Development of Mobile Machines		Prüfung (PR)	Geimer
SS 2020	76-T-MACH-105311	Design and Development of Mobile Machines		Prüfung (PR)	Geimer

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

2113079, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.89 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	Recurrence	Version
Completed coursework	0	Each term	1

Exams				
WS 19/20	76-T-MACH-108887	Design and Development of Mobile Machines - Advance	Prüfung (PR)	Geimer
SS 2020	76-T-MACH-108887	Design and Development of Mobile Machines - Advance	Prüfung (PR)	Geimer

Competence Certificate
Preparation of semester report

Prerequisites
none

T 7.90 Course: Design Basics in Highway Engineering [T-BGU-106613]

Responsible: Prof. Dr.-Ing. Ralf Roos
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-100998 - Design, Construction, Operation and Maintenance of Highways

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6200408	Design Basics in Highway Engineering	2 SWS	Lecture (V)	Roos, Zimmermann

Prerequisites
None

Recommendation
None

Annotation
None

T 7.91 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-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2545008	Design Thinking (Track 1)	2 SWS	Seminar (S)	Jochem, Terzidis, Lau
SS 2020	2545008	Design Thinking (Track 1)	2 SWS	Seminar (S)	Terzidis, González
Exams					
WS 19/20	7900084	Design Thinking (Track 1)		Prüfung (PR)	Terzidis
SS 2020	7900053	Design Thinking (Track 1)		Prüfung (PR)	Terzidis

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 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

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 goals:

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.

T 7.92 Course: Designing Interactive Systems [T-WIWI-110851]

Responsible: Prof. Dr. Alexander Mädche
Dr. Stefan Morana

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	1

Events					
SS 2020	2540558	Designing Interactive Systems	3 SWS	Lecture (V)	Mädche, Gnewuch , Benke

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

Annotation
This course replaces T-WIWI-108461 "Interactive Information Systems" starting summer term 2020.

The course is held in english.

Below you will find excerpts from events related to this course:

V Designing Interactive Systems

2540558, SS 2020, 3 SWS, Language: English, Open in study portal

Lecture (V)

Content
Description

Computers have evolved from batch processors towards highly interactive systems. This offers new possibilities but also challenges for the successful design of the interaction between human and computer. Interactive system are socio-technical systems in which users perform tasks by interacting with technology in a specific context in order to achieve specified goals and outcomes.

The aim of this course is to introduce advanced concepts and theories, interaction technologies as well as current practice of contemporary interactive systems.

The course is complemented with a design capstone project, where students in a team select and apply design methods & techniques in order to create an interactive prototype

Learning objectives

- Get an advanced understanding of conceptual foundations of interactive systems from a human and computer perspective
- explore the theoretical grounding of Interactive Systems leveraging theories from reference disciplines such as psychology
- know specific design principles for the design of advanced interactive systems
- get hands-on experience in conceptualizing and designing advanced Interactive Systems to solve a real-world challenge from an industry partner by applying the lecture contents.

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 7.93 Course: Developing Business Models for the Semantic Web [T-WIWI-102851]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Competence Certificate
Alternative exam assessments.

Prerequisites
None

Recommendation
As a recommendation to attending the seminar, basic knowledge about semantic technologies and concepts should be available. This may be acquired by attending one of the following lectures – Wissensmanagement, Semantic Web Technologies 1, Semantic Web Technologies 2 or by studying related literature. Furthermore the topic entrepreneurship should be of interest.

T 7.94 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	Recurrence	Version
Examination of another type	4,5	Each winter term	3

Events					
WS 19/20	2511402	Digital Health	2 SWS	Lecture (V)	Sunyaev, Thiebes
Exams					
WS 19/20	7900068	Digital Health		Prüfung (PR)	Sunyaev

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.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Digital Health

2511402, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Lecture (V)

Content
The course Digital Health offers students a possibility to gain insight into current developments in the digitalization of the health care system. Students will first be introduced to the basics and challenges of the digitalization of the health care system. After the introduction lecture, the course aims to give insights into current topics in the field of digital health and offers students an opportunity to prepare a scientific paper in a group of up to three students.

There will be a short introduction lecture on all topics with regard to the written assignments. It is possible for students to write their paper in one of the following topics. Furthermore, groups of students have the possibility to propose their own topics.

- **Artificial Intelligence**
- **Blockchain**
- **Cloud Computing**
- **Gamification**
- **Genomics**
- **Information Privacy**

In addition to introduction lectures on the topics, an online course is offered to introduce students to scientific writing. This includes learning how to quote, how a scientific paper is structured and in which form the results of one's research are presented. Since we offer topics that also correspond to the research interests of our research associates, there may also be the opportunity to investigate these topics more deeply in a master thesis. Students can give their preferences for the topics offered and are afterwards assigned to groups of up to three students based on their preferences.

Learning objectives:

Students are familiar with the current developments and challenges of digitization in the health care sector, can independently develop corresponding solutions, and discuss their developed solutions in groups.

Workload:

4,5 ECTS = approx. 135 hours.

Comments:

The number of participants is limited. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/3107

Please keep the following dates available if you are planning to attend the course:

- **Introduction:** 3 dates you have to attend
  - **10.2019, 15.45 to 17.15:** Foundations of Digital Health. (Geb. 05.20, R1C-03)
  - **10.2019, 15.45 to 17.15:** Cloud Computing, Genomics, Information Privacy (Geb. 05.20, R1C-03)
  - **11.2019, 15.45 to 17.15:** Blockchain, Artificial Intelligence, Gamification (Geb. 05.20, R1C-03)
- **Intermediate presentation** to be attended: 04.12.2019, 10:00 to 16:00 (Building 05.20, R1A-11). Exact times will be announced soon.
- **Final presentation to be attended:** 02.2020 and 27.02.2020, 09:00 to 19:00 (Building 05.20, R1C-03). Exact times will be announced soon.
- **Submission of the written assignment:** Estimated on 12.02.2019. Final date will be announced in the event.

Further information on the procedure will be announced in the first lecture. Depending on the number of participants, each session may have a shorter duration.

The meetings will take place at the Institute AIFB, KIT-Campus Süd, Kollegiengebäude am Kronenplatz (building 05.20), Kaiserstr. 89.

The number of participants is limited to 30 students. The registration period is from **31.08.2019 to 17.10.2019**. The places are expected to be allocated on **18.10.2019** and must be accepted by the students by **22.10.2019**. If the allocation is not accepted, the free places will be offered to the students in the waiting list.

If you have any questions regarding this registration, please contact scott.thiebes@kit.edu or manuel.schmidt-kraepelin@kit.edu.

T 7.95 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsible: Anja Konhäuser
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each winter term	1

Events					
WS 19/20	2572176	Digital Marketing and Sales in B2B	1 SWS	Others (sonst.)	Konhäuser
Exams					
WS 19/20	7900169	Digital Marketing and Sales in B2B		Prüfung (PR)	Klarmann

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
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

2572176, WS 19/20, 1 SWS, Language: English, Open in study portal

Others (sonst.)

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.

Literature
-

T 7.96 Course: Digital Services: Business Models and Transformation [T-WIWI-110280]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-102754 - Service Economics and Management

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2595484	Digital Services: Business Models and Transformation	2 SWS	Lecture (V)	Satzger, Schüritz
WS 19/20	2595485		1 SWS	Practice (Ü)	Enders, Schüritz
Exams					
WS 19/20	7900302	Digital Services: Business Models and Transformation		Prüfung (PR)	Satzger

Competence Certificate
The assessment of this course is a written examination (60 min.) (following §4(2), 1 SPOs) and by submitting written papers as part of the exercise.

Prerequisites
None

Recommendation
None

Annotation
former name until winter semester 2019/2020: "Business and IT Service Management" (T-WIWI-102881)

Below you will find excerpts from events related to this course:

V Digital Services: Business Models and Transformation

2595484, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
While the digitalization creates new opportunities for organizations, it also comes with its challenges: formerly proven business models become obsolete and need to be refined, internal processes cannot keep up with the requirements of the market and need to reassessed in any way.

The shift towards a service-based economy enables and requires companies to leverage advances in information technology to create added value for their customers. In particular, the emergence of big data and analytics enables better decision-making. The lecture teaches approaches that enable organizations to adapt their business models to new market requirements and showcases how to plan and execute a successful transformation to the desired organizational setup.

The lecture links academic content with practical examples and excises. Students are asked to actively engage in the discussion and contribute their knowledge. Invited guest speakers from industry and case studies emphasize the practical character of this lecture.

Literature

Böhmann, T./ Leimeister, J.M./ Möslein, K. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79

Cardoso et al. (Hrsg.) (2015), Fundamentals on Service Systems

Hartmann/ Zaki/ Feldmann/ Neely (2016), Capturing value from big data - a taxonomy of data-driven business models used by start-up firms, IJPOR, 36 (10), 1382-1406.

Schüritz R./Seebacher S./Satzger G./Schwartz L. (2017), Datatization as the Next Frontier of Servitization; in Proceedings of International Conference on Information Systems 2017

Vargo S. / Lusch R. (2017) Service-dominant logic 2025, in: IJRM 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.

Wirtz, B.(2019): "Digital Business Models – Concepts, Models, and the Alphabet Case Study". Springer.

T 7.97 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2020	2545103	Digital Transformation and Business Models	2 SWS	Seminar (S)	Koch
Exams					
SS 2020	7900284	Digital Transformation and Business Models		Prüfung (PR)	Weissenberger-Eibl

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.

Below you will find excerpts from events related to this course:

V Digital Transformation and Business Models

2545103, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
The seminar "Digital Transformation and Business Models" aims at the development of thematic aspects of digital transformation with simultaneous application of different business model methodologies. Established companies face the challenge of digital transformation. The digital transformation is particularly relevant for the business models of industrial enterprises. As part of innovation management, the examination of business model changes against the background of digital transformation is one of the main challenges facing the German economy. At the beginning, seminar topics will be assigned. These will be presented and discussed at the end of the seminar. In the first seminar date impulses to business model methodologies and the digital transformation take place, which are to be discussed then, in order to provide an understanding for the topic complex and to ensure the purposeful development of the seminar topics.

T 7.98 Course: Digital Transformation of Organizations [T-WIWI-106201]

Responsible: Prof. Dr. Alexander Mädche
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-102808 - Digital Service Systems in Industry
M-WIWI-104068 - Information Systems in Organizations

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2540556	Digital Transformation of Organizations	3 SWS	Lecture (V)	Mädche
Exams					
WS 19/20	7900230	Digital Transformation of Organizations		Prüfung (PR)	Mädche

Competence Certificate
The lecture will be offered for the last time in summer semester 2020. The last possibility for examination is in winter semester 2020/21 (only for repeaters).

The assessment consists of a written exam of 1 hour length and by submitting written papers as part of the exercise. Details will be announced at the beginning of the course.

Prerequisites
None

Annotation
The course will be held in English.

Below you will find excerpts from events related to this course:

V Digital Transformation of Organizations

2540556, SS 2020, 3 SWS, Language: English, Open in study portal

Lecture (V)

Literature
siehe englischsprachige Literaturliste

T 7.99 Course: Digitalization from Production to the Customer in the Optical Industry [T-MACH-110176]

Responsible: Marc Wawerla
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Examination of another type	4	Each winter term	1

Events					
WS 19/20	2149701	Digitalization from Production to the Customer in the Optical Industry	2 SWS	Lecture (V)	Wawerla
Exams					
WS 19/20	76-T-MACH-110176	Digitalization from Production to the Customer in the Optical Industry		Prüfung (PR)	Wawerla

Competence Certificate
Alternative test achievement (graded):
- Processing and presentation (ca. 15 min) of a case study with weighting 20%
- Oral exam (ca. 20 min) with weighting 80%

Prerequisites
none

Below you will find excerpts from events related to this course:

V Digitalization from Production to the Customer in the Optical Industry

2149701, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

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

T 7.100 Course: Digitalization of Products, Services & Production [T-MACH-108491]

Responsible: Dr.-Ing. Bernd Pätzold
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101281 - Virtual Engineering B
M-MACH-101283 - Virtual Engineering A

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	1

Events					
WS 19/20	2122310	Digitalization of Products, Services & Production	2 SWS	Seminar (S)	Pätzold
Exams					
WS 19/20	76-T-MACH-108491	Digitalization of Products, Services & Production		Prüfung (PR)	Pätzold

Competence Certificate
Assessment of another type. Two presentations in team work and two written compositions. Grading: each composition 1/6 and each presentation 2/3.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Digitalization of Products, Services & Production

2122310, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content

- Digitalization of products, services and production in the context of Industry 4.0 .
- Key drivers for ongoing digitalization and their impact on future product development and manufacturing.
- Methods and procedures to design the according transformation process.
- Intensive group discussions of use-case scenarios using practical examples from the industry.

Students are able to

- describe the fundamental challenges and objectives of the progressive digitalization of products, service and production. In context of these challenges, students can name and explain the essential terms.
- illustrate the key drivers and fundamental technologies behind the digitalization of products, services and processes.
- describe the challenges of the ongoing digitalization and the corresponding changes in business processes and distinguish between them in regards to time and place. Furthermore, students are able to assign the IT-Architecture and systems to the corresponding process steps.
- highlight the requirement for future information management in networks of product development and production institutions and can clarify how to validated and safeguard the corresponding IT processes.
- to analyze the challenges of digitalization and present potential solution approaches via self-created scenarios for future developments.

Literature
Vorlesungsfolien / lecture slides

T 7.101 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6243803	Verfahrenstechniken der Demontage	2 SWS	Lecture / Practice (VÜ)	Gentes
Exams					
WS 19/20	8240101850	Disassembly Process Engineering		Prüfung (PR)	Gentes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.102 Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research in Supply Chain Management

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2550488	Ereignisdiskrete Simulation in Produktion und Logistik	3 SWS	Lecture (V)	Spieckermann

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 2020, 3 SWS, Language: German, Open in study portal

Lecture (V)

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.

Literature

- 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 7.103 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2113077	Drive Train of Mobile Machines	2 SWS	Lecture (V)	Geimer, Herr
WS 19/20	2113078	Übung zu 'Antriebsstrang mobiler Arbeitsmaschinen'	1 SWS	Practice (Ü)	Geimer, Herr
Exams					
WS 19/20	76-T-MACH-105307	Drive Train of Mobile Machines		Prüfung (PR)	Geimer
SS 2020	76-T-MACH-105307	Drive Train of Mobile Machines		Prüfung (PR)	Geimer

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

2113077, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.104 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2560402	Dynamic Macroeconomics	2 SWS	Lecture (V)	Scheffel
WS 19/20	2560403	Übung zu Dynamic Macroeconomics	1 SWS	Practice (Ü)	Krause
Exams					
WS 19/20	7900261	Dynamic Macroeconomics		Prüfung (PR)	Scheffel

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Dynamic Macroeconomics

2560402, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 7.105 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Responsible: PD Dr. Patrick Jochem
Prof. Dr. Russell McKenna
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Recurrence	Version
Written examination	3,5	Each summer term	1

Events					
SS 2020	2581006	Efficient Energy Systems and Electric Mobility	2 SWS	Lecture (V)	Jochem, Fichtner
Exams					
WS 19/20	7981006	Efficient Energy Systems and Electric Mobility		Prüfung (PR)	Fichtner

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Efficient Energy Systems and Electric Mobility

2581006, SS 2020, 2 SWS, Language: English, Open in study portal **Lecture (V)**

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

Literature
Wird in der Vorlesung bekanntgegeben.

T 7.106 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture (V)	Weinhardt, Notheisen
WS 19/20	2540455	Übungen zu eFinance: Wirtschaftsinformatik für den Wertpapierhandel	1 SWS	Practice (Ü)	Jaquart, Soufi
Exams					
WS 19/20	7900182	eFinance: Information Engineering and Management for Securities Trading		Prüfung (PR)	Weinhardt
WS 19/20	7900309	eFinance: Information Systems for Securities Trading		Prüfung (PR)	Weinhardt

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.

Prerequisites
see below

Below you will find excerpts from events related to this course:

V eFinance: Information Systems for Securities Trading

2540454, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.107 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2307378	Electronics and EMC	2 SWS	Lecture (V)	Sack
Exams					
WS 19/20	7307378	Electronics and EMC		Prüfung (PR)	Sack

T 7.108 Course: Elements and Systems of Technical Logistics [T-MACH-102159]

Responsible: Georg Fischer
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2117096	Elements and systems of Technical Logistics	3 SWS	Lecture / Practice (VÜ)	Mittwollen, Rauscher
Exams					
WS 19/20	76-T-MACH-102159	Elements and Systems of Technical Logistics		Prüfung (PR)	Mittwollen

Competence Certificate
The assessment consists of an oral exam (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" (T-MACH-109919) preconditioned.

Below you will find excerpts from events related to this course:

V Elements and systems of Technical Logistics

2117096, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content
Learning goals:

Students are able to:

- Describe elements and systems of technical logistics,
- Model and calculate structures and functions of special conveying machines,
- Describe interdependence of material flow systems and technique quantitatively and qualitatively
- Equip material flow systems with appropriate machines.

Content of teaching:

- material flow systems and their (conveying) technical components
- mechanical behaviour of conveyors;
- structure and function of conveyor machines; elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)
- sample applications and calculations in addition to the lectures inside practical lectures

Presence: 36h

Rework: 84h

Annotations:

- Knowledge out of **Basics of Technical Logistics** (LV 2117095) preconditioned.
- 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.

Literature
Empfehlungen in der Vorlesung.

Recommendations during lectures.

T 7.109 Course: Elements and Systems of Technical Logistics - Project [T-MACH-108946]

Responsible: Georg Fischer
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Recurrence	Version
Examination of another type	2	Each winter term	1

Events					
WS 19/20	2117097	Elements and systems of Technical Logistics - project	SWS	Project (PRO)	Mittwollen, Rauscher
Exams					
WS 19/20	76-T-MACH-108946	Elements and Systems of Technical Logistics - Project		Prüfung (PR)	Mittwollen

Competence Certificate
Presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation

Prerequisites
T-MACH-102159 (Elements and Systems of Technical Logistics) must have been started

Recommendation
Knowledge out of "Basics of Technical Logistics I" (T-MACH-109919) preconditioned.

Below you will find excerpts from events related to this course:

V Elements and systems of Technical Logistics - project

2117097, WS 19/20, SWS, Language: German, Open in study portal

Project (PRO)

Content
Learing goals:

Students are able to:

- Describe elements and systems of technical logistics,
- Model and calculate structures and functions of special conveying machines,
- Describe interdependence of material flow systems and technique quantitatively and qualitatively,
- Equip material flow systems with appropriate machines
- Judge about systems in place and justify it in front of subject related persons.

Content of teaching:

- mechanical behaviour of conveyors;
- structure and function of conveyor machines;
- elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)
- sample applications and calculations in addition to the lectures inside practical lectures
- Self manufacturing of a project report to recesses the topic.

Media:

supplementary sheets,presentations, blackboard

Prerequisites:

T-MACH-102159 (Elements and Systems of technical logistics) must have been started.

Annotations:

- Knowledge out of **Basics of Technical Logistics (LV 2117095)** preconditioned.
- Presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation.

T 7.110 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2513404	Emerging Trends in Digital Health (Bachelor)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513405	Emerging Trends in Digital Health (Master)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
Exams					
SS 2020	7900146	Emerging Trends in Digital Health (Master)		Prüfung (PR)	Sunyaev

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 7.111 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2513402	Emerging Trends in Internet Technologies (Bachelor)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513403	Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
Exams					
SS 2020	7900128	Emerging Trends in Internet Technologies (Master)		Prüfung (PR)	Sunyaev

Competence Certificate
The alternative exam assessment consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

T 7.112 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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581962	Emissions into the Environment	2 SWS	Lecture (V)	Karl
Exams					
WS 19/20	7981962	Emissions into the Environment		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Recommendation
None

Below you will find excerpts from events related to this course:

V Emissions into the Environment

2581962, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.113 Course: Employment Law I [T-INFO-101329]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24167	Employment Law I	2 SWS	Lecture (V)	Hoff
Exams					
WS 19/20	7500040	Employment Law I		Prüfung (PR)	Dreier, Matz
SS 2020	7500097	Employment Law I		Prüfung (PR)	Dreier, Matz

T 7.114 Course: Employment Law II [T-INFO-101330]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
SS 2020	24668	Employment Law II	2 SWS	Lecture (V)	Hoff
Exams					
WS 19/20	7500058	Employment Law II		Prüfung (PR)	Dreier, Matz
SS 2020	7500098	Employment Law II		Prüfung (PR)	Dreier, Matz

T 7.115 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2581003	Energy and Environment	2 SWS	Lecture (V)	Karl
SS 2020	2581004	Übungen zu Energie und Umwelt	1 SWS	Practice (Ü)	Keles, Weinand
Exams					
WS 19/20	7981003	Energy and Environment		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy and Environment

2581003, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.116 Course: Energy and Process Technology I [T-MACH-102211]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Dr.-Ing. Corina Schwitzke
Dr. Amin Velji
Heiner Wirbser

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101296 - Energy and Process Technology I

Type	Credits	Recurrence	Version
Written examination	9	Each winter term	1

Events					
WS 19/20	2157961	Energy and Process Technology I	6 SWS	Lecture / Practice (VÜ)	Wirbser, Bauer, Mitarbeiter, Wagner
Exams					
WS 19/20	76-T-MACH-102211	Energy and Process Technology I		Prüfung (PR)	Bauer, Wirbser, Schwitzke
SS 2020	76-T-MACH-102211	Energy and Process Technology I		Prüfung (PR)	Bauer, Wirbser, Schwitzke

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 19/20, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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 7.117 Course: Energy and Process Technology II [T-MACH-102212]

Responsible: Dr.-Ing. Corina Schwitzke
Heiner Wirbser

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101297 - Energy and Process Technology II

Type	Credits	Recurrence	Version
Written examination	9	Each summer term	1

Events					
SS 2020	2170832	Energy and Process Technology II	6 SWS	Lecture / Practice (VÜ)	Schwitzke, Wirbser, Pritz
Exams					
WS 19/20	76-T-MACH-102212	Energy and Process Technology II		Prüfung (PR)	Schwitzke, Wirbser, Bauer
SS 2020	76-T-MACH-102212	Energy and Process Technology II		Prüfung (PR)	Wirbser, Schwitzke, Bauer

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 2020, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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 7.118 Course: Energy Conversion and Increased Efficiency in Internal Combustion Engines [T-MACH-105564]

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

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101275 - Combustion Engines I

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2133121	Energy Conversion and Increased Efficiency in Internal Combustion Engines	2 SWS	Lecture (V)	Koch
Exams					
WS 19/20	76-T-MACH-105564	Energy Conversion and Increased Efficiency in Internal Combustion Engines		Prüfung (PR)	Koch
SS 2020	76-T-MACH-105564	Energy Conversion and Increased Efficiency in Internal Combustion Engines		Prüfung (PR)	Koch, Kubach

Competence Certificate
oral exam, 25 minutes, no auxillary means

Prerequisites
none

Below you will find excerpts from events related to this course:

V Energy Conversion and Increased Efficiency in Internal Combustion Engines

2133121, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
1. Introduction
2. Thermodynamics of combustion engines
3. Fundamentals
4. gas exchange
5. Flow field
6. Wall heat losses
7. Combustion in gasoline engines
8. Pressure Trace Analysis
9. Combustion in Diesel engines
10. Waste heat recovery

T 7.119 Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

Responsible: Dr.-Ing. Meike Braun
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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2117500	Energy efficient intralogistic systems	2 SWS	Lecture (V)	Braun, Schönung
Exams					
WS 19/20	76-T-MACH-105151	Energy Efficient Intralogistic Systems		Prüfung (PR)	Braun

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The content of course “Basics of Technical Logistics” should be knownn.

Literature
Keine.

T 7.120 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2540464	Energy Market Engineering	2 SWS	Lecture (V)	Staudt, vom Scheidt
SS 2020	2540465	Übung zu Energy Market Engineering	1 SWS	Practice (Ü)	Staudt, Richter
Exams					
WS 19/20	7901171	Energy Market Engineering (Nachklausur aus dem SS19)		Prüfung (PR)	Weinhardt

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.121 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540494	Energy Networks and Regulation	2 SWS	Lecture (V)	Rogat
WS 19/20	2540495	Übung zu Energy Networks and Regulation	1 SWS	Practice (Ü)	Rogat
Exams					
WS 19/20	7900198	Energy Networks and Regulation		Prüfung (PR)	Weinhardt
WS 19/20	7900236	Energy Networks and Regulation		Prüfung (PR)	Weinhardt

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 19/20, 2 SWS, Open in study portal **Lecture (V)**

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 7.122 Course: Energy Policy [T-WIWI-102607]

Responsible: Prof. Dr. Martin Wietschel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Recurrence	Version
Written examination	3,5	Each summer term	3

Events					
SS 2020	2581959	Energy Policy	2 SWS	Lecture (V)	Wietschel
Exams					
WS 19/20	7981959	Energy Policy		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy Policy

2581959, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The availability of cheap, environmentally friendly and secure energy is crucial for human welfare. However, the increasing scarcity of resources and increasing environmental pressures, with a particular focus on climate change, threaten human welfare through economic action. Energy contributes significantly to environmental pollution. The energy industry is characterised by high regulation and a significant influence of political decisions.

At the beginning of the lecture different perspectives on energy policy will be presented and the analysis of political decision-making processes will be discussed. Then the current energy policy challenges in the area of environmental pollution, regulation and the role of energy for households and industry will be discussed. Then the actors of energy policy and energy responsibilities in Europe will be discussed. The economic approaches from traditional environmental economics and sustainability as a new policy approach will then be discussed. Finally, energy policy instruments such as the promotion of renewable energies or energy efficiency are discussed in detail and how they can be evaluated.

The lecture emphasizes the relationship between theory and practice and presents some case studies.

Literature
Wird in der Vorlesung bekannt gegeben.

T 7.123 Course: Energy Systems Analysis [T-WIWI-102830]

Responsible: Dr. Armin Ardone
Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energy Economics and Technology

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581002	Energy Systems Analysis	2 SWS	Lecture (V)	Ardone, Keles, Dengiz, Yilmaz
Exams					
WS 19/20	7981002	Energy Systems Analysis		Prüfung (PR)	Fichtner

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

Prerequisites
None

Recommendation
None

Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Below you will find excerpts from events related to this course:

V Energy Systems Analysis

2581002, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
1. Overview and classification of energy systems modelling approaches
2. Usage of scenario techniques for energy systems analysis
3. Unit commitment of power plants
4. Interdependencies in energy economics
5. Scenario-based decision making in the energy sector
6. Visualisation and GIS techniques for decision support in the energy sector

Learning goals:

The student

- has the ability to understand and critically reflect the methods of energy system analysis, the possibilities of its application in the energy industry and the limits and weaknesses of this approach
- can use select methods of the energy system analysis by her-/himself

Literature
Weiterführende Literatur:

- Möst, D. und Fichtner, W.: **Einführung zur Energiesystemanalyse**, in: Möst, D., Fichtner, W. und Grunwald, A. (Hrsg.): Energiesystemanalyse, Universitätsverlag Karlsruhe, 2009
- Möst, D.; Fichtner, W.; Grunwald, A. (Hrsg.): **Energiesystemanalyse** - Tagungsband des Workshops "Energiesystemanalyse" vom 27. November 2008 am KIT Zentrum Energie, Karlsruhe, Universitätsverlag Karlsruhe, 2009 [PDF: http://digbib.ubka.uni-karlsruhe.de/volltexte/documents/928852]

T 7.124 Course: Energy Trade and Risk Management [T-WIWI-102691]

Responsible: Dr. Clemens Cremer
Dr. Dogan Keles
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	2581020	Energy Trade and Risk Management	2 SWS	Lecture (V)	Keles
Exams					
WS 19/20	7981020	Energy Trade and Risk Management		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 minutes).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Energy Trade and Risk Management

2581020, SS 2020, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

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 7.125 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2134137	Engine measurement techniques	2 SWS	Lecture (V)	Bernhardt
Exams					
WS 19/20	76-T-MACH-105169	Engine Measurement Techniques		Prüfung (PR)	Koch
SS 2020	76-T-MACH-105169	Engine Measurement Techniques		Prüfung (PR)	Koch

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.126 Course: Engineering FinTech Solutions [T-WIWI-106193]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105036 - FinTech Innovations

Type	Credits	Recurrence	Version
Examination of another type	9	Each term	4

Events					
WS 19/20	2500020	Engineering FinTech Solutions	6 SWS	Practical course (P)	Ulrich
SS 2020	2530357	Engineering FinTech Solutions	6 SWS	Practical course (P)	Ulrich
Exams					
SS 2020	7900287	Engineering FinTech Solutions		Prüfung (PR)	Ulrich

Competence Certificate
The assessment is carried out in form of a written thesis based on the course "Engineering FinTech Solutions".

Prerequisites
In order to take the course "Engineering FinTech Solutions", students must have completed the module "Data Science for Finance".

Below you will find excerpts from events related to this course:

V Engineering FinTech Solutions

2500020, WS 19/20, 6 SWS, Language: English, Open in study portal

Practical course (P)

Content
The assessment is carried out in form of a written thesis based on the course "Engineering FinTech Solutions".

This project invites students to either pursue their own FinTech innovation project or to contribute to the Chair's ongoing innovation projects.

The course is targeted to students with strong knowledge in the field of computational risk and asset management and strong programming skills. It offers students the opportunity to develop an algorithmic solution and hence ample their programming experience and their understanding of financial economics or asset and risk management.

In order to take the course "Engineering FinTech Solutions", students must have completed the module "Data Science for Finance" with a grade of 1.3 or better.

The total workload for this course is approximately 270 hours. This consists of regular meetings with members of the research group and time for independent work on the software project.

Students will learn to connect innovative financial research with modern information technology to build a prototype that solves some daunting tasks for professional end-users in the field of modern asset and risk management.

V Engineering FinTech Solutions

2530357, SS 2020, 6 SWS, Language: English, Open in study portal

Practical course (P)

Content
The assessment is carried out in form of a written thesis based on the course "Engineering FinTech Solutions".

This project invites students to either pursue their own FinTech innovation project or to contribute to the Chair's ongoing innovation projects.

The course is targeted to students with strong knowledge in the field of computational risk and asset management and strong programming skills. It offers students the opportunity to develop an algorithmic solution and hence ample their programming experience and their understanding of financial economics or asset and risk management.

In order to take the course "Engineering FinTech Solutions", students must have completed the module "Data Science for Finance" with a grade of 1.3 or better.

The total workload for this course is approximately 270 hours. This consists of regular meetings with members of the research group and time for independent work on the software project.

Students will learn to connect innovative financial research with modern information technology to build a prototype that solves some daunting tasks for professional end-users in the field of modern asset and risk management.

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

T 7.127 Course: Engineering Hydrology [T-BGU-108943]

Responsible: 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	6200617	Ingenieurhydrologie	2 SWS	Lecture / Practice (VÜ)	Ehret
Exams					
WS 19/20	8236108943	Engineering Hydrology		Prüfung (PR)	Ehret

Competence Certificate
See German version.

Prerequisites
None

T 7.128 Course: Engineering Interactive Systems [T-WIWI-110877]

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	Recurrence	Version
Examination of another type	4,5	Each winter term	1

Events					
WS 19/20	2540420	Digital Service Design	3 SWS	Lecture (V)	Mädche

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.

Below you will find excerpts from events related to this course:

V Digital Service Design

2540420, WS 19/20, 3 SWS, Language: English, Open in study portal

Lecture (V)

Literature
Siehe Englische Literatur

T 7.129 Course: Enterprise Architecture Management [T-WIWI-102668]

Responsible: Thomas Wolf
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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511600	Enterprise Architecture Management	2 SWS	Lecture (V)	Wolf
WS 19/20	2511601	Exercises to Enterprise Architecture Management	1 SWS	Practice (Ü)	Wolf
Exams					
WS 19/20	7900010	Enterprise Architecture Management		Prüfung (PR)	Oberweis
SS 2020	7900043	Enterprise Architecture Management (Registration until 13 July 2020)		Prüfung (PR)	Wolf

Competence Certificate
Please note that the exam for first writers will be offered for the last time in winter semester 2019/2020. A last examination possibility exists in the summer semester 2020 (only for repeaters).

The assessment of this course is a written (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Enterprise Architecture Management

2511600, WS 19/20, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Content
The following topics will be covered: components of enterprise architecture, enterprise strategy including methods to develop strategies, business process (re)engineering, methods to implement changes within enterprises (management of change).

Learning objectives:

Students understand the connection between enterprise strategy, business processes and business objects and IT architecture; they know methods to depict these connections and how they can be developed based on each other.

Literature

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995
- Doppler, K., Lauterburg, Ch.: Change Management. Campus Verlag 1997
- Jacobson, I.: The Object Advantage, Business Process Reengineering with Object Technology. Addison-Wesley Publishing Company, Wokingham England 1994
- Keller, G., Teufel, Th.: SAP R/3 prozessorientiert anwenden. Addison Wesley 1998
- Österle, H.: Business Engineering Bd. 1 und 2. Springer Verlag, Berlin 1995

T 7.130 Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	3

Competence Certificate
Please note: The seminar cannot be offered in the winter semester 2019/2020 due to organizational reasons.
Alternative exam assessment.

Prerequisites
None

Recommendation
None

T 7.131 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	Recurrence	Version
Written examination	3	Each term	1

Events					
SS 2020	2545001	Entrepreneurship	2 SWS	Lecture (V)	Terzidis
Exams					
WS 19/20	7900045	Entrepreneurship		Prüfung (PR)	Terzidis
WS 19/20	7900229	Entrepreneurship		Prüfung (PR)	Terzidis

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Entrepreneurship

2545001, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Literature
Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship
Ries, Eric (2011): The Lean Startup
Osterwalder, Alexander (2010): Business Model Generation

T 7.132 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)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2020	2545002	Entrepreneurship Research	2 SWS	Seminar (S)	Terzidis, Henn
Exams					
SS 2020	7900052	Entrepreneurship Research		Prüfung (PR)	Terzidis

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 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Literature
Wird im Seminar bekannt gegeben.

T 7.133 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	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2020	2560548	Environmental and Ressource Policy	2 SWS	Lecture / Practice (VÜ)	Walz
Exams					
WS 19/20	7900294	Environmental and Resource Policy		Prüfung (PR)	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 2020, 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 7.134 Course: Environmental Communication [T-BGU-101676]

Responsible: Dr. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	2

Events					
WS 19/20	6224905	Umweltkommunikation / Environmental Communication	2 SWS	Seminar (S)	Kämpf
SS 2020	6224905	Environmental Communication	2 SWS	Seminar (S)	Kämpf
Exams					
WS 19/20	8244101676	Environmental Communication		Prüfung (PR)	Kämpf

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 7.135 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	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2521547	Umweltökonomik und Nachhaltigkeit (mit Übung)	2 SWS	Lecture / Practice (VÜ)	Walz
Exams					
WS 19/20	7900295	Environmental Economics and Sustainability		Prüfung (PR)	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 7.136 Course: Environmental Law [T-INFO-101348]

Responsible: Dr. Tristan Barczak
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law
M-WIWI-101468 - Environmental Economics

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24140	Umweltrecht	2 SWS	Lecture (V)	Barczak
Exams					
WS 19/20	7500050	Environmental Law		Prüfung (PR)	Barczak
SS 2020	7500082	Environmental Law		Prüfung (PR)	Eichenhofer

T 7.137 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	24666	Europäisches und Internationales Recht	2 SWS	Lecture (V)	Brühann
Exams					
WS 19/20	7500048	European and International Law		Prüfung (PR)	Barczak
SS 2020	7500084	European and International Law		Prüfung (PR)	Eichenhofer

T 7.138 Course: Examination Prerequisite Environmental Communication [T-BGU-106620]

Responsible: Dr. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Recurrence	Version
Completed coursework	0	Each summer term	1

Events					
WS 19/20	6224905	Umweltkommunikation / Environmental Communication	2 SWS	Seminar (S)	Kämpf
SS 2020	6224905	Environmental Communication	2 SWS	Seminar (S)	Kämpf
Exams					
WS 19/20	8244106620	Examination Prerequisite Environmental Communication		Prüfung (PR)	Kämpf

Competence Certificate
2 literature annotations, appr. 150 words each, and
short presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.139 Course: Exercises in Civil Law [T-INFO-102013]

Responsible: Prof. Dr. Thomas Dreier
Dr. Yvonne Matz
Organisation: KIT Department of Informatics
Part of: M-INFO-101191 - Commercial Law

Type	Credits	Recurrence	Version
Examination of another type	9	Each term	2

Events					
WS 19/20	24011	Commercial and Corporate Law	2 SWS	Lecture (V)	Wiele
SS 2020	24504	Advanced Civil Law	2 SWS	Lecture (V)	Matz
SS 2020	24506	Exercises in Civil Law	2 SWS	Lecture (V)	Dreier
SS 2020	24926	Case Studies in Civil Law	2 SWS	Practice (Ü)	Käde, Hägle
Exams					
WS 19/20	7500108	Commercial Law		Prüfung (PR)	Dreier, Matz
SS 2020	7500099	Wirtschaftsprivatrecht		Prüfung (PR)	Dreier, Matz

T 7.140 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

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540489	Experimental Economics	2 SWS	Lecture (V)	Peukert, Dorner
WS 19/20	2540493	Übung zu Experimentelle Wirtschaftsforschung	1 SWS	Practice (Ü)	Greif-Winzrieth, Pietruska
Exams					
WS 19/20	7900178	Experimental Economics		Prüfung (PR)	Weinhardt
WS 19/20	7900194	Experimental Economics		Prüfung (PR)	Weinhardt

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

Below you will find excerpts from events related to this course:

V Experimental Economics

2540489, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.141 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	Recurrence	Version
Completed coursework	4	Each winter term	2

Events					
WS 19/20	2173560	Welding Lab Course, in groupes	3 SWS	Practical course (P)	Dietrich, Schulze
Exams					
WS 19/20	76-T-MACH-102099	Experimental Lab Class in Welding Technology, in Groups		Prüfung (PR)	Heilmaier, Dietrich

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 19/20, 3 SWS, Language: German, Open in study portal

Practical course (P)

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:

Certificate to be issued after evaluation of the lab class report
You need sturdy shoes and long clothes!

workload:

regular attendance: 31,5 hours
preparation: 8,5 hours
lab report: 80 hours

Literature
wird im Praktikum ausgegeben

T 7.142 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	Recurrence	Version
Written examination	4,5	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 7.143 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	Recurrence	Version
Oral examination	3	Each term	1

Events					
WS 19/20	2143882	Fabrication Processes in Microsystem Technology	2 SWS	Lecture (V)	Bade
SS 2020	2143882	Fabrication Processes in Microsystem Technology	2 SWS	Lecture (V)	Bade
Exams					
WS 19/20	76-T-MACH-102166	Fabrication Processes in Microsystem Technology		Prüfung (PR)	Bade

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 — Lecture (V)

2143882, WS 19/20, 2 SWS, Language: German, Open in study portal

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 — Lecture (V)

2143882, SS 2020, 2 SWS, Language: German, Open in study portal

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 7.144 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2181711	Failure of structural materials: deformation and fracture	3 SWS	Lecture / Practice (VÜ)	Gumbsch, Weygand
Exams					
WS 19/20	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture		Prüfung (PR)	Weygand, Gumbsch, Kraft
SS 2020	76-T-MACH-102140	Failure of Structural Materials: Deformation and Fracture		Prüfung (PR)	Kraft, Weygand, Gumbsch

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 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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.

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 7.145 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2181715	Failure of Structural Materials: Fatigue and Creep	2 SWS	Lecture (V)	Gruber, Gumbsch
Exams					
WS 19/20	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep		Prüfung (PR)	Kraft, Gumbsch, Gruber

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.146 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2530205	Financial Analysis	2 SWS	Lecture (V)	Luedecke
SS 2020	2530206	Übungen zu Financial Analysis	2 SWS	Practice (Ü)	Luedecke
Exams					
WS 19/20	7900059	Financial Analysis		Prüfung (PR)	Luedecke, Ruckes

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.147 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	Recurrence	Version
Written examination	4,5	Irregular	2

Events					
SS 2020	2520022	Financial Econometrics	2 SWS	Lecture (V)	Schienle
SS 2020	2520023	Übungen zu Financial Econometrics I	2 SWS	Practice (Ü)	Schienle, Görgen

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 course takes place each second summer term: 2018/2020....

Below you will find excerpts from events related to this course:

V Financial Econometrics

2520022, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.148 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530232	Financial Intermediation	2 SWS	Lecture (V)	Ruckes
WS 19/20	2530233	Übung zu Finanzintermediation	1 SWS	Practice (Ü)	Ruckes, Hoang, Benz
Exams					
WS 19/20	7900063	Financial Intermediation		Prüfung (PR)	Ruckes

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6. Auflage, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2. Auflage, MIT Press.

T 7.149 Course: Firm creation in IT security [T-WIWI-110374]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
WS 19/20	2545109	Basic concepts of Entrepreneurship in the area of IT security	2 SWS	Seminar (S)	Ntagiakou, Kienzle
SS 2020	2545109	Basic concepts of Entrepreneurship in the area of IT security	2 SWS	Seminar (S)	Ntagiakou, Kienzle, Terzidis
Exams					
WS 19/20	7900155	Firm creation in IT security		Prüfung (PR)	Terzidis

Competence Certificate
Alternative exam assessment. The grade consists of the presentation and the written elaboration.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Basic concepts of Entrepreneurship in the area of IT security

2545109, WS 19/20, 2 SWS, Language: German/English, Open in study portal **Seminar (S)**

Content
In order to identify opportunities, the participants should identify fields for entrepreneurial opportunities in a systematic web research. For this purpose, Systematic Mapping procedures will be adapted to the research of general web sources and applied to the research of interesting fields in the area of cyber security.

Information about the seminar:

In the seminar you will work in groups of max. 4 persons. Group applications are welcome but not a prerequisite for participation.

Some of the seminars will be held in English.

The focus of the seminar is Opportunity Recognition in the field of IT-Security, followed by ideation sessions with the aim to find possible applications for technologies that are developed at the KIT. Prototyping and also Pitching are part of the seminar.

Target group:

Master Students

Information on the allocation of seminar places:

The registration for the seminar is possible in the Wiwi portal in the period from 11.09.2019 to 05.10.2019 at 23:55 clock. To apply for the seminar, please send us a letter of motivation (max. 5 sentences).

Seminar contents:

- To identify opportunities, the participants should identify fields for entrepreneurial opportunities in a systematic web research. For this purpose, Systematic Mapping procedures will be adapted to the research of general web sources and applied to the research of interesting fields in the area of cyber security.
- All information will be discussed with experts on the second seminar day. The aim of the first two sessions is to develop a systematic segmentation of market needs.
- After the teams have been formed, the workshop "Technology Application Selection (TAS)" follows. This is a framework developed by EnTechnon that will help the teams to develop concrete business ideas based on given technologies. The three steps of the TAS will be the content of the third and fourth seminar days. Participants will generate ideas and then - based on specific criteria that we will provide - choose an idea on which they will build their value proposition.
- The final session before the final day will deal with prototyping and validation. This will use rapid prototyping and validation methods from the design thinking environment.
- On the last day - before their final presentations - the participants learn how to present the idea in a short presentation (pitch) to an interested audience.

V **Basic concepts of Entrepreneurship in the area of IT security** **Seminar (S)**
2545109, SS 2020, 2 SWS, Language: German/English, Open in study portal

Content
In order to identify opportunities, the participants should identify fields for entrepreneurial opportunities in a systematic web research. For this purpose, Systematic Mapping procedures will be adapted to the research of general web sources and applied to the research of interesting fields in the area of cyber security.

Information about the seminar:

In the seminar you will work in groups of max. 4 persons. Group applications are welcome but not a prerequisite for participation.

Some of the seminars will be held in English.

The focus of the seminar is Opportunity Recognition in the field of IT-Security, followed by ideation sessions with the aim to find possible applications for technologies that are developed at the KIT. Prototyping and also Pitching are part of the seminar.

Target group:

Master Students

Information on the allocation of seminar places:

The registration for the seminar is possible in the Wiwi portal in the period from 11.09.2019 to 05.10.2019 at 23:55 clock. To apply for the seminar, please send us a letter of motivation (max. 5 sentences).

Seminar contents:

- To identify opportunities, the participants should identify fields for entrepreneurial opportunities in a systematic web research. For this purpose, Systematic Mapping procedures will be adapted to the research of general web sources and applied to the research of interesting fields in the area of cyber security.
- All information will be discussed with experts on the second seminar day. The aim of the first two sessions is to develop a systematic segmentation of market needs.
- After the teams have been formed, the workshop "Technology Application Selection (TAS)" follows. This is a framework developed by EnTechnon that will help the teams to develop concrete business ideas based on given technologies. The three steps of the TAS will be the content of the third and fourth seminar days. Participants will generate ideas and then - based on specific criteria that we will provide - choose an idea on which they will build their value proposition.
- The final session before the final day will deal with prototyping and validation. This will use rapid prototyping and validation methods from the design thinking environment.
- On the last day - before their final presentations - the participants learn how to present the idea in a short presentation (pitch) to an interested audience.

T 7.150 Course: Fixed Income Securities [T-WIWI-102644]

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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530260	Fixed Income Securities	3 SWS	Lecture / Practice (VÜ)	Uhrig-Homburg, Mitarbeiter
Exams					
WS 19/20	7900053	Fixed Income Securities		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment takes place in the form of a written examination (75 minutes) according to §4(2), 1 SPO. The examination takes place during the semester break. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the excercises. 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
Knowledge from the course "Derivatives" is very helpful.

Annotation
The oourse is offered as a block course.

Below you will find excerpts from events related to this course:

V Fixed Income Securities

2530260, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content
The lecture deals with both German and international bond markets, which are an important source of funding for both the corporate and the public sector. After an overview of the most important bond markets, various definitions of return are discussed. Based on that, the concept of the yield curve is presented. The modelling of the dynamics of the term structure of interest rates provides the theoretical foundation for the valuation of interest rate derivatives, which is discussed in the last part of the lecture.

The objective of this course is to become familiar with national and international bond markets. Therefore, we first have a look at financial instruments that are of particular importance. Thereafter, specific models and methods that allow the evaluation of interest rate derivatives are introduced and applied.

The total workload for this course is approximately 135.0 hours. For further information see German version.

The assessment consists of a written exam following §4, Abs. 2, 1.

- Bühler, W., Uhrig-Homburg, M., Rendite und Renditestruktur am Rentenmarkt, in Obst/Hintner, Geld-, Bank- und Börsenwesen - Handbuch des Finanzsystems, (2000), S.298-337.
- Sundaresan, S., Fixed Income Markets and Their Derivatives, Academic Press, 3rd Edition, (2009).

Elective literature:

- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition, (2012).

Literature

- Bühler, W., Uhrig-Homburg, M., Rendite und Renditestruktur am Rentenmarkt, in Obst/Hintner, Geld-, Bank- und Börsenwesen - Handbuch des Finanzsystems, (2000), S.298-337.
- Sundaresan, S., Fixed Income Markets and Their Derivatives, Academic Press, 3rd Edition, (2009).

Weiterführende Literatur:

- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition, (2012).

T 7.151 Course: Fluid Power Systems [T-MACH-102093]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Felix Pult

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering
M-MACH-101267 - Mobile Machines

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	2

Events					
WS 19/20	2114093	Fluid Technology	2 SWS	Lecture (V)	Geimer, Pult
Exams					
WS 19/20	76T-MACH-102093	Fluid Power Systems		Prüfung (PR)	Geimer
SS 2020	76-T-MACH-102093	Fluid Power Systems		Prüfung (PR)	Geimer

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.152 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	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2020	2174575	Foundry Technology	2 SWS	Lecture (V)	Wilhelm

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Moulding and casting processes

Solidifying of melts

Castability

Fe-Alloys

Non-Fe-Alloys

Moulding and additive materials

Core production

Sand reclamation

Design in casting technology

Casting simulation

Foundry Processes

learning objectives:

The students know the specific moulding and casting techniques and are able to describe them in detail. The students know the application of moulding and casting techniques concerning castings and metals, their advantages and disadvantages in comparison, their application limits and are able to describe these in detail.

The students know the applied metals and are able to describe advantages and disadvantages as well as the specific range of use.

The students are able, to describe detailled mould and core materials, technologies, their application focus and mould-affected casting defects.

The students know the basics of casting process of any casting parts concerning the above mentioned criteria and are able to describe detailled.

requirements:
Required: Material Science and Engineering I and II
workload:

The workload for the lecture Foundry Technology 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 werden in der Vorlesung gegeben

Reference to literature, documentation and partial lecture notes given in lecture

T 7.153 Course: Freight Transport [T-BGU-106611]

Responsible: 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	Recurrence	Version
Written examination	3	Each term	2

Events					
SS 2020	6232809	Güterverkehr	2 SWS	Lecture / Practice (VÜ)	Chlond
Exams					
WS 19/20	8245106611	Freight Transport		Prüfung (PR)	Chlond

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.154 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Responsible: Dr.-Ing. Bernhard Ulrich Kehrwald
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2133108	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture (V)	Kehrwald
Exams					
WS 19/20	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines		Prüfung (PR)	Kehrwald
SS 2020	76-T-MACH-105184	Fuels and Lubricants for Combustion Engines		Prüfung (PR)	Kehrwald

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Introduction and basics

Fuels for Gasoline and Diesel engines

Hydrogen

Lubricants for Gasoline and Diesel engines

Coolants for combustion engines

Literature
Skript

T 7.155 Course: Fundamentals for Design of Motor-Vehicle Bodies I [T-MACH-102116]

Responsible: Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Recurrence	Version
Oral examination	1,5	Each winter term	1

Events					
WS 19/20	2113814	Fundamentals for Design of Motor-Vehicles Bodies I	1 SWS	Lecture (V)	Bardehle
Exams					
WS 19/20	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I		Prüfung (PR)	Unrau, Bardehle

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 19/20, 1 SWS, Language: German, Open in study portal

Lecture (V)

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.

Literature
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T 7.156 Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

Responsible: Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

Type	Credits	Recurrence	Version
Oral examination	1,5	Each summer term	1

Events					
SS 2020	2114840	Fundamentals for Design of Motor-Vehicles Bodies II	1 SWS	Lecture (V)	Bardehle
Exams					
WS 19/20	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II		Prüfung (PR)	Bardehle

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 2020, 1 SWS, Language: German, Open in study portal

Lecture (V)

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.

Literature
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg

T 7.157 Course: Fundamentals in the Development of Commercial Vehicles I [T-MACH-105160]

Responsible: Prof. Dr. Jörg Zürn
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Recurrence	Version
Oral examination	1,5	Each winter term	1

Events					
WS 19/20	2113812	Fundamentals in the Development of Commercial Vehicles I	1 SWS	Lecture (V)	Zürn
Exams					
WS 19/20	76-T-MACH-105160	Fundamentals in the Development of Commercial Vehicles I		Prüfung (PR)	Zürn

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 in the Development of Commercial Vehicles I

2113812, WS 19/20, 1 SWS, Language: German, Open in study portal

Lecture (V)

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.

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.

T 7.158 Course: Fundamentals in the Development of Commercial Vehicles II [T-MACH-105161]

Responsible: Prof. Dr. Jörg Zürn
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development
M-MACH-101267 - Mobile Machines

Type	Credits	Recurrence	Version
Oral examination	1,5	Each summer term	1

Events					
SS 2020	2114844	Fundamentals in the Development of Commercial Vehicles II	1 SWS	Lecture (V)	Zürn
Exams					
WS 19/20	76-T-MACH-105161	Fundamentals in the Development of Commercial Vehicles II		Prüfung (PR)	Zürn

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 in the Development of Commercial Vehicles II

2114844, SS 2020, 1 SWS, Language: German, Open in study portal

Lecture (V)

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.

Literature

1. Schittler, M., Heinrich, R., Kerschbaum, W.: Mercedes-Benz Baureihe 500 -- neue V-Motorengeneration für schwere Nutzfahrzeuge, MTZ 57 Nr. 9, S. 460 ff., 1996

2. Robert Bosch GmbH (Hrsg.): Bremsanlagen für Kraftfahrzeuge, VDI-Verlag, Düsseldorf, 1. Auflage, 1994

3. Rubi, V., Strifler, P. (Hrsg. Institut für Kraftfahrwesen RWTH Aachen): Industrielle Nutzfahrzeugentwicklung, Schriftenreihe Automobiltechnik, 1993

T 7.159 Course: Fundamentals of Automobile Development I [T-MACH-105162]

Responsible: Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Recurrence	Version
Written examination	1,5	Each winter term	1

Events					
WS 19/20	2113810	Fundamentals of Automobile Development I	1 SWS	Lecture (V)	Frech
WS 19/20	2113851	Principles of Whole Vehicle Engineering I	1 SWS	Lecture (V)	Frech
Exams					
WS 19/20	76-T-MACH-105162	Fundamentals of Automobile Development I		Prüfung (PR)	Frech, Unrau

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 19/20, 1 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 19/20, 1 SWS, Language: English, Open in study portal

Lecture (V)

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.

Literature
Skript zur Vorlesung wird zu Beginn des Semesters ausgegeben

The scriptum will be provided during the first lessons

T 7.160 Course: Fundamentals of Automobile Development II [T-MACH-105163]

Responsible: Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Recurrence	Version
Written examination	1,5	Each summer term	2

Events					
SS 2020	2114842	Fundamentals of Automobile Development II	1 SWS	Lecture (V)	Frech
SS 2020	2114860	Principles of Whole Vehicle Engineering II	1 SWS		Frech
Exams					
WS 19/20	76-T-MACH-105163	Fundamentals of Automobile Development II		Prüfung (PR)	Unrau, Frech

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 II

2114842, SS 2020, 1 SWS, Language: German, Open in study portal

Lecture (V)

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.

Literature
Skript zur Vorlesung ist über ILIAS verfügbar.

V Principles of Whole Vehicle Engineering II

2114860, SS 2020, 1 SWS, Language: English, Open in study portal

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.

Literature
Das Skript zur Vorlesung ist über ILIAS verfügbar.

T 7.161 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsible: Prof. Dr. Olaf Deutschmann
Prof. Dr. Jan-Dierk Grunwaldt
Dr.-Ing. Heiko Kubach
Prof. Dr.-Ing. Egbert Lox

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture (V)	Lox, Grunwaldt, Deutschmann
Exams					
WS 19/20	76-T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment		Prüfung (PR)	Lox
SS 2020	76-T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment		Prüfung (PR)	Lox

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.162 Course: Gas Engines [T-MACH-102197]

Responsible: Dr.-Ing. Rainer Golloch
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Exams				
SS 2020	76-T-MACH-102197	Gas Engines	Prüfung (PR)	Koch

Competence Certificate
Oral examination, duration 25 min., no auxillary means

Prerequisites
none

T 7.163 Course: Gear Cutting Technology [T-MACH-102148]

Responsible: Dr.-Ing. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2149655	Gear Technology	2 SWS	Lecture (V)	Klaiber
Exams					
WS 19/20	76-T-MACH-102148	Gear Technology		Prüfung (PR)	Klaiber

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Gear Technology

2149655, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.164 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Exams				
WS 19/20	7900005_WS1920_NK	Global Optimization I	Prüfung (PR)	Stein

Competence Certificate
Please note: due to the research semester of Prof. Dr. Stein the lecture will not be offered in summer semester 2020.

Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO).

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.

T 7.165 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	Recurrence	Version
Written examination	9	Each summer term	1

Exams				
WS 19/20	7900007_WS1920_NK	Global Optimization I and II	Prüfung (PR)	Stein

Competence Certificate
Please note: due to the research semester of Prof. Dr. Stein the lectures will not be offered in summer semester 2020.

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

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.

T 7.166 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Exams				
WS 19/20	7900006_WS1920_NK	Global Optimization II	Prüfung (PR)	Stein

Competence Certificate
Please note: due to the research semester of Prof. Dr. Stein the lecture will not be offered in summer semester 2020.

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

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.

T 7.167 Course: Global Production and Logistics - Part 1: Global Production [T-MACH-105158]

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

Part of: M-MACH-101282 - Global Production and Logistics

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2149610	Global Production and Logistics - Part 1: Global Production	2 SWS	Lecture (V)	Lanza
Exams					
WS 19/20	76-T-MACH-105158	Global Production and Logistics - Part 1: Global Production		Prüfung (PR)	Lanza

Competence Certificate
Written Exam (60 min)

Prerequisites
"T-MACH-108848 - Globale Produktion und Logistik - Teil 1: Globale Produktion" must not be commenced.

Below you will find excerpts from events related to this course:

V Global Production and Logistics - Part 1: Global Production

2149610, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.168 Course: Global Production and Logistics - Part 2: Global Logistics [T-MACH-105159]

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	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2020	2149600	Global Production and Logistics - Part 2: Global Logistics	2 SWS	Lecture (V)	Furmans
Exams					
WS 19/20	76-T-MACH-105159	Global Production and Logistics - Part 2: Global Logistics		Prüfung (PR)	Furmans
SS 2020	76-T-MACH-105159	Global Production and Logistics - Part 2: Global Logistics		Prüfung (PR)	Furmans

Competence Certificate
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

Prerequisites
none

Below you will find excerpts from events related to this course:

V Global Production and Logistics - Part 2: Global Logistics

2149600, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.169 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	Recurrence	Version
Written examination	4,5	Irregular	2

Exams				
WS 19/20	7900287	Graph Theory and Advanced Location Models	Prüfung (PR)	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" 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.

T 7.170 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2113807	Handling Characteristics of Motor Vehicles I	2 SWS	Lecture (V)	Unrau
Exams					
WS 19/20	76-T-MACH-105152	Handling Characteristics of Motor Vehicles I		Prüfung (PR)	Unrau

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 7.171 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2114838	Handling Characteristics of Motor Vehicles II	2 SWS	Lecture (V)	Unrau
Exams					
WS 19/20	76-T-MACH-105153	Handling Characteristics of Motor Vehicles II		Prüfung (PR)	Unrau

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 7.172 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	Recurrence	Version
Written examination	3	Each summer term	1

Exams				
WS 19/20	7981001	Heat Economy	Prüfung (PR)	Fichtner

Competence Certificate
The lecture will be suspended in summer semester 2019 and 2020 and will probably be offered again in summer semester 2021.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Recommendation
None

Annotation
See German version.

T 7.173 Course: High Performance Powder Metallurgy Materials [T-MACH-102157]

Responsible: Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2126749	Advanced powder metals	2 SWS	Lecture (V)	Schell
Exams					
WS 19/20	76-T-MACH-102157	High Performance Powder Metallurgy Materials		Prüfung (PR)	Schell

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.174 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	Recurrence	Expansion	Version
Written examination	6	Each winter term	1 terms	1

Events					
WS 19/20	2307360	High-Voltage Technology	2 SWS	Lecture (V)	Badent
WS 19/20	2307362	Tutorial for 2307362High-Voltage Technology	1 SWS	Practice (Ü)	Badent
Exams					
WS 19/20	730360	High-Voltage Technology		Prüfung (PR)	Badent

T 7.175 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2307392	High-Voltage Test Technique	2 SWS	Lecture (V)	Badent
WS 19/20	2307394	Tutorial for 2307392 High-Voltage Test Technique	2 SWS	Practice (Ü)	Görtz
Exams					
WS 19/20	7307392	High-Voltage Test Technique		Prüfung (PR)	Badent

Prerequisites
none

T 7.176 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Exams				
WS 19/20	7900113	Human Factors in Security and Privacy	Prüfung (PR)	Volkamer
SS 2020	7900084	Human Factors in Security and Privacy (Registration until 13 July 2020)	Prüfung (PR)	Volkamer

Competence Certificate
The lecture will not be offered in the winter semester 2019/2020.

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.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
Successful participation in the exercises.

Recommendation
The prior attendance of the lecture "Information Security" is strongly recommended.

T 7.177 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

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2573003	Incentives in Organizations	2 SWS	Lecture (V)	Nieken
SS 2020	2573004	Übung zu Incentives in Organizations	2 SWS	Practice (Ü)	Nieken, Mitarbeiter
Exams					
WS 19/20	7900201	Incentives in Organizations		Prüfung (PR)	Nieken

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.

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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: 32h

Preparation of lecture: 52h

Exam preparation: 51h

Literature
Slides

Additional case studies and research papers will be announced in the lecture.

T 7.178 Course: Industrial Services [T-WIWI-102822]

Responsible: Prof. Dr. Hansjörg Fromm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-102808 - Digital Service Systems in Industry

Type	Credits	Recurrence	Version
Written examination	4,5	see Annotations	1

Events					
WS 19/20	2595505	Industrial Services	2 SWS	Lecture (V)	Fromm
WS 19/20	2595506	Übungen zu Industrial Services	1 SWS	Practice (Ü)	Walk
Exams					
WS 19/20	7900241	Industrial Services		Prüfung (PR)	Fromm

Competence Certificate
For students taking the exam for the first time, the exam will be offered for the last time in summer semester 2020.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
None

Annotation
The lecture is no longer offered.

Below you will find excerpts from events related to this course:

V Industrial Services

2595505, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Services are becoming ever more important in business. Today, the gross income share of services in Germany exceeds 70%. Following this trend, many companies that previously focused solely on the sale of goods, strive to an extension of their business model: In order to realize new competitive advantages in domestic and international markets, they enrich their material goods with customer-specific services. This transformation to a provider of integrated solutions is called "Servitization" (Neely 2009). For this reason, so-called industrial services to companies of increasing importance. They benefit from the increasingly detailed data collected (on "Big Data"), e.g. concerning user profiles, failure statistics, usage history, accrued expenses, etc. Only these data allow in principle to end products and spare parts are delivered faster, cheaper and more targeted and technicians can be used more efficiently with the correct skills. This requires, however, also suitable methods of optimization, prognosis or predictive modeling. When used properly, such methods can minimize logistics costs, increase availability, prevent potential failures and improve repair planning. This is also enabled by latest "Technology Enabled Services" along with corresponding data transfer and analysis ("Internet of Things", automatic error detection, remote diagnostics, centralized collection of consumption data, etc.). The change from goods manufacturer to a provider of integrated solutions requires new services, transformation of business models as well as intelligent new contract types, which are addressed in the course as well.

More specifically, the lessons of this lecture will include:

- Servitization – The Manufacturer's Transformation to Integrated Solution Provider
- The "Services Supply Chain"
- Spare Parts Planning – Forecasting, Assortment Planning, Order Quantities and Safety Stocks
- Distribution Network Planning – Network Types, Models, Optimization
- Service Technician Planning
- Condition Monitoring, Predictive Maintenance, Diagnose Systems
- Call Center Services
- Full Service Contracts
- IT-enabled Value-Added Services – Industrial Service Innovation

Learning Goals:
Participants understand the interrelation between Front-Office (Customer view, e.g. material availability, technician skills, maintenance quality, repair time) and Back-Office (Provider view, e.g. distribution planning, inventory optimization, technician work schedule, call center). They learn about forecasting algorithms for sporadic demands, which are typical in spare part supply, and they apply common inventory optimization models for stock planning. They also become familiar with full-cost service contracts, as well as with the latest product-related services that have been enabled only in recent years by modern IT and mobile technology.

Update March 2020: The lecture was offered the last time in the winter term 2019/20. The exam in the summer term 2020 is still open to all students. The exam in the winter term 2020/21 is only open to students that previously failed the exam.

Literature
Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (Vol. 3, p. 30). New York: Wiley.

Pintelon, L., & Van Puyvelde, F. (2013). *Asset Management. The Maintenance Perspective*. Acco.

Chopra, S., & Meindl, P. (2007). Supply chain management. Strategy, planning & operation. In *Das summa summarum des management* (pp. 265-275). Gabler.

Koole, G. (2007). Call Center Mathematics: A scientific method for understanding and improving contact centers. *Departement of Mathematics, Vrije Universiteit, Amsterdam*.

Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services. *International journal of service industry management*, *14*(2), 160-172.

T 7.179 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	Recurrence	Version
Examination of another type	3	Each term	2

Events					
SS 2020	2122014	Information Engineering	2 SWS	Seminar (S)	Ovtcharova, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-102209	Information Engineering		Prüfung (PR)	Ovtcharova

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 2020, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

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.

Literature
Themenspezifische Literatur

T 7.180 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Competence Certificate
lecture accompanying exercises, appr. 5 pieces

Prerequisites
none

Recommendation
none

Annotation
none

T 7.181 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2511606	Information Service Engineering	2 SWS	Lecture (V)	Sack
SS 2020	2511607	Exercises to Information Service Engineering	1 SWS	Practice (Ü)	Sack
Exams					
WS 19/20	7900071	Information Service Engineering		Prüfung (PR)	Sack
SS 2020	7900070	Information Service Engineering (Registration until 13 July 2020)		Prüfung (PR)	Sack

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

2511606, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
- Information, Natural Language and the Web

- Natural Language Processing

- NLP and Basic Linguistic Knowledge
- NLP Applications, Techniques & Challenges
- Evaluation, Precision and Recall
- Regular Expressions and Automata
- Tokenization
- Language Model and N-Grams
- Part-of-Speech Tagging

- Knowledge Graphs

- Knowledge Representations and Ontologies
- Resource Description Framework (RDF) as simple Data Model
- Creating new Models with RDFS
- Querying RDF(S) with SPARQL
- More Expressivity via Web Ontology Language (OWL)
- From Linked Data to Knowledge Graphs
- Wikipedia, DBpedia, and Wikidata
- Knowledge Graph Programming

- Basic Machine Learning

- Machine Learning Fundamentals
- Evaluation and Generalization Problems
- Linear Regression
- Decision Trees
- Unsupervised Learning
- Neural Networks and Deep Learning

- ISE Applications

- From Data to Knowledge
- Data Mining, Information Visualization and Knowledge Discovery
- Semantic Search
- 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.
- S. Hitzler, S. Rudolph, Foundations of Semantic Web Technologies, Chapman / Hall, 2009.
- R. Baeza-Yates, B. Ribeiro-Neto, Modern Information Retrieval, 2nd ed., Addison Wesley, 2010.
- S. Marsland, Machine Learning - An Algorithmic Perspective, 2nd ed., CRC Press, 2015

T 7.182 Course: Information Systems and Supply Chain Management [T-MACH-102128]

Responsible: Dr. Christoph Kilger
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	Recurrence	Version
Oral examination	3	Each summer term	2

Events					
SS 2020	2118094	Information Systems in Logistics and Supply Chain Management	2 SWS	Lecture (V)	Kilger
Exams					
WS 19/20	76T-MACH-102128	Information Systems and Supply Chain Management		Prüfung (PR)	Mittwollen
SS 2020	76-T-MACH-102128	Information Systems and Supply Chain Management		Prüfung (PR)	Mittwollen

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 Information Systems in Logistics and Supply Chain Management

2118094, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Stadtler, Kilger: Supply Chain Management and Advanced Planning, Springer, 4. Auflage 2008

T 7.183 Course: Infrastructure Management [T-BGU-106300]

Responsible: Prof. Dr.-Ing. Ralf Roos
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	Recurrence	Version
Written examination	6	Each term	1

Events					
SS 2020	6233801	Entwurf und Bau von Straßen	2 SWS	Lecture (V)	Roos
SS 2020	6233802	Betrieb und Erhaltung von Straßen	2 SWS	Lecture (V)	Roos
Exams					
WS 19/20	8245106300	Infrastructure Management		Prüfung (PR)	Roos

Competence Certificate
written exam, 120 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.184 Course: Innovation Lab [T-ETIT-110291]

Responsible: Prof. Dr.-Ing. Sören Hohmann
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	Recurrence	Expansion	Version
Examination of another type	9	Each winter term	2 terms	1

Events					
WS 19/20	2303192	Innovation Lab	2 SWS	Project (PRO)	Hohmann, Zwick, Sax, Stork
SS 2020	2303192	Innovation Lab	2 SWS	Project (PRO)	Hohmann, Zwick, Sax, Stork
Exams					
WS 19/20	7303192	Innovation Lab		Prüfung (PR)	Hohmann, Zwick, Stork, Sax

Competence Certificate
see module description

T 7.185 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	2545100	Innovation Management: Concepts, Strategies and Methods	2 SWS	Lecture (V)	Weissenberger-Eibl
Exams					
SS 2020	7900144	Innovation Management: Concepts, Strategies and Methods		Prüfung (PR)	Weissenberger-Eibl
SS 2020	7900145	Innovation Management: Concepts, Strategies and Methods		Prüfung (PR)	Weissenberger-Eibl

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 7.186 Course: Innovation Processes Live [T-WIWI-110234]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Exams				
WS 19/20	7900141	Innovation Processes Live	Prüfung (PR)	Weissenberger-Eibl

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO). The grade consists of an exposé (15%), a guideline interview or an analysis tool (25%), a group presentation of the results (20%) and a seminar paper (40%).

Prerequisites
None.

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

T 7.187 Course: Innovation Theory and Policy [T-WIWI-102840]

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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2560236	Innovationtheory and -policy	SWS	Lecture (V)	Ott
SS 2020	2560237		1 SWS	Practice (Ü)	Ott, Eraydin

Competence Certificate
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.

A bonus can be earned through a short written homework and its presentation in the exercise. If the grade of the written examination 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 course.

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 Innovationtheory and -policy

2560236, SS 2020, SWS, Language: German/English, Open in study portal

Lecture (V)

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 7.188 Course: Integrated Product Development [T-MACH-105401]

Responsible: Prof. Dr.-Ing. Albert Albers
Albers Assistenten

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102626 - Major Field: Integrated Product Development

Type	Credits	Recurrence	Version
Oral examination	18	Each winter term	1

Events					
WS 19/20	2145156	Integrated Product Development	4 SWS	Lecture (V)	Albers
WS 19/20	2145157	Workshop Product Development	4 SWS	Practice (Ü)	Albers, Mitarbeiter
WS 19/20	2145300	Project Work in Product Development	2 SWS	Others (sonst.)	Albers
Exams					
WS 19/20	7600021	Integrated Product Development		Prüfung (PR)	Albers

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 Integrated Product Development

2145156, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

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 Product Development** **Practice (Ü)**
2145157, WS 19/20, 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 in Product Development** **Others (sonst.)**

2145300, WS 19/20, 2 SWS, Language: German, Open in study portal

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 7.189 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	Recurrence	Version
Written examination	9	Each summer term	1

Events					
SS 2020	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (VÜ)	Lanza
Exams					
WS 19/20	76-T-MACH-109054	Integrated Production Planning in the Age of Industry 4.0		Prüfung (PR)	Lanza

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

2150660, SS 2020, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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 (production planning and control, fine layout, IT systems in an industry 4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The lecture contents are rounded off by numerous current practical examples with a strong industry 4.0 reference. 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 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.

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 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 7.190 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Responsible: Dr. Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2020	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture (V)	Schlichtenmayer
Exams					
WS 19/20	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars		Prüfung (PR)	Schlichtenmayer

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)

2150601, SS 2020, 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 7.191 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-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2540537	Intelligent Agents and Decision Theory	SWS	Lecture (V)	Geyer-Schulz
SS 2020	2540538	Übung zu Intelligent Agents and Decision Theory	SWS	Practice (Ü)	Schweizer

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

2540537, SS 2020, SWS, Language: English, Open in study portal

Lecture (V)

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. Chap 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.

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 7.192 Course: Intelligent CRM Architectures [T-WIWI-103549]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2540525	Intelligent CRM Architectures	2 SWS	Lecture (V)	Geyer-Schulz
WS 19/20	2540526	Übung zu Intelligent CRM Architectures	1 SWS	Practice (Ü)	Nazemi
Exams					
WS 19/20	79011480	Intelligent CRM Architectures		Prüfung (PR)	Geyer-Schulz

Competence Certificate
This lecture will be offered for the last time in winter semester 2019/20.

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 CRM Architectures

2540525, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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

The grade consists of approximately 91% of exam points and 9% of exercise points.

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 7.193 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	2530570	International Finance	2 SWS	Lecture (V)	Walter, Uhrig-Homburg
Exams					
WS 19/20	7900052	International Finance		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Annotation
See German version.

Below you will find excerpts from events related to this course:

V International Finance

2530570, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur:

- Eiteman, D. et al., Multinational Business Finance, 13. Auflage, 2012.
- Solnik, B. und D. McLeavey, Global Investments, 6. Auflage, 2008.

T 7.194 Course: International Management in Engineering and Production [T-WIWI-102882]

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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581956	International Management in Engineering and Production	2 SWS	Lecture (V)	Sasse
Exams					
WS 19/20	7981956	International Management in Engineering and Production		Prüfung (PR)	Schultmann

Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V International Management in Engineering and Production

2581956, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.195 Course: International Selling – EUCOR [T-WIWI-110381]

Responsible: Erice Casenave
Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

Events					
WS 19/20	2572179	International Selling – EUCOR	2 SWS	Block (B)	Klarmann
Exams					
WS 19/20	7900298	International Selling – EUCOR		Prüfung (PR)	Klarmann

Competence Certificate
Non exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation (presentation). The grade is based on the presentation and the subsequent discussion.

Prerequisites
The courses "Business Planning for Founders - EUCOR" and the course "International Selling - EUCOR" must be taken together.

Annotation

An application is required to participate in this course. 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.
Please note that the courses "Business Planning for Founders - EUCOR" (3 ECTS) and "International Selling - EUCOR" (3 ECTS) can only be taken together (6 ECTS in total). In combination with the mandatory course "Sales Management and Retailing" (3 ECTS) the module is completed.

Below you will find excerpts from events related to this course:

V International Selling – EUCOR

2572179, WS 19/20, 2 SWS, Language: English, Open in study portal **Block (B)**

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 developed in the LV "Business Planning for Founders - EUCOR".

- 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.
- Please note that the courses "Business Planning for Founders - EUCOR" (3 ECTS) and "International Selling - EUCOR" (3 ECTS) can only be taken together (6 ECTS in total). In combination with the mandatory course "Sales Management and Retailing" (3 ECTS) the module is completed.

Total workload for 3 ECTS: about 90 hours.

T 7.196 Course: Internet Law [T-INFO-101307]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	24354	Internet Law	2 SWS	Lecture (V)	Dreier
Exams					
WS 19/20	7500060	Internet Law		Prüfung (PR)	Dreier, Matz
SS 2020	7500057	Internet Law		Prüfung (PR)	Dreier, Matz

T 7.197 Course: Introduction to Bayesian Statistics for Analyzing Data [T-WIWI-110918]

Responsible: Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

Events					
SS 2020	2572175	Introduction to Bayesian Statistics for Analyzing Data	2 SWS	Lecture (V)	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, participation will be limited to 10 students. If you want to participate, please send a short email to scheibehenne@kit.edu until Thursday, the 23rd of April in which you outline why you are interested in this class and what your expectations are.

The class will consist of three day-long sessions from 9:00 (s.t.) to 18:00. The first session will be held on Thursday, the 7th of May 2020. The second session will be on Thursday, the 28th of May. The third session will be on Thursday, the 18th of June. The classroom will be communicated to registered students in advance. In case classrooms will be closed due to the Corona virus, the class will be taught online and the schedule will be adapted.

Below you will find excerpts from events related to this course:

V Introduction to Bayesian Statistics for Analyzing Data

2572175, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Goal

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.

Requirements

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.

Schedule

The class will consist of three day-long sessions from 9:00 (s.t.) to 18:00. The first session will be held on Thursday, the 7th of May 2020. The second session will be on Thursday, the 28th of May. The third session will be on Thursday, the 18th of June. The classroom will be communicated to registered students in advance. In case classrooms will be closed due to the Corona virus, the class will be taught online and the schedule will be adapted.

Grading

Grades will be based on active participation (50%) and homework assignments (50%).

Registration and number of participants

Due to its interactive nature, participation will be limited to 10 students. If you want to participate, please send a short email to scheibehenne@kit.edu until Thursday, the 23rd of April in which you outline why you are interested in this class and what your expectations are.

Literature

McElrath, R. (2016). Statistical Rethinking. A Bayesian Course with Examples in R and Stan. Taylor & Francis Group. (main literature)

Kruschke, J. (2014). Doing Bayesian Data Analysis: A Tutorial Introduction with R. Academic Press. (additional literature)

T 7.198 Course: Introduction to Ceramics [T-MACH-100287]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	2125757	Introduction to Ceramics	3 SWS	Lecture (V)	Hoffmann
Exams					
WS 19/20	76-T-MACH-100287	Introduction to Ceramics		Prüfung (PR)	Hoffmann, Schell, Wagner

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 19/20, 3 SWS, Language: German, Open in study portal

Lecture (V)

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 7.199 Course: Introduction to Data Science [T-WIWI-110863]

Responsible: Steffen Herbold
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	Recurrence	Version
Written examination	4,5	Once	1

Events					
SS 2020	2511608	Introduction to Data Science	2 SWS	Lecture (V)	Herbold
SS 2020	2511609	Exercises to Introduction to Data Science	1 SWS	Practice (Ü)	Herbold
Exams					
SS 2020	7900104	Introduction to Data Science (Registration until 13 July 2020)		Prüfung (PR)	Herbold

Competence Certificate
The assessment consists of a written exam (60 min).

Please note that lecture and exam will be offered once in the summer semester 2020. The repeat examination will take place in winter semester 2020/21 (only for repeaters).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Introduction to Data Science

2511608, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The main topic of this lecture is data science, i.e., methods to extract information from data with a scientific approach. We approach this topic from a practical side in this lecture. This means, that we concern ourselves directly with what algorithms do, and where they should be applied. The details of the algorithms and the theory behind them are not part of this lecture. Methods considered in this lecture include:

- Association rule mining with the APRIORI approach
- Clustering with k-means, EM for gaussian mixtures, DBSCAN, and single linkage clustering
- Classification with k-nearest neighbor, decision trees, random forests, logistic regression, naive Bayes, support vector machines, and neural networks
- Linear regression with ridge and lasso
- Time series analysis with ARMA
- Fundamentals of text mining

Additionally, we will consider the analysis of Big Data. In this context, we will consider the following topics:

- The MapReduce paradigm
- Apache Hadoop and Apache Spark

Literature
To be announced.

T 7.200 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	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	6339050	Grundlagen der Hydrogeologie (Studienplan 2009 G10-1, G10-2)	4 SWS	Lecture / Practice (VÜ)	Goldscheider
Exams					
WS 19/20	8210_101499	Introduction to Hydrogeology		Prüfung (PR)	Goldscheider

Competence Certificate
Written exam with 90 minutes

Prerequisites
none

T 7.201 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-ETIT-101159 - Sensor Technology II
M-MACH-101287 - Microsystem Technology

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2141861	Introduction to Microsystem Technology I	2 SWS	Lecture (V)	Korvink, Badilita
Exams					
WS 19/20	76-T-MACH-105182	Introduction to Microsystem Technology I		Prüfung (PR)	Korvink, Badilita

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 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.202 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-ETIT-101159 - Sensor Technology II
M-MACH-101287 - Microsystem Technology

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	2142874	Introduction to Microsystem Technology II	2 SWS	Lecture (V)	Korvink, Badilita
Exams					
WS 19/20	76-T-MACH-105183	Introduction to Microsystem Technology II		Prüfung (PR)	Korvink, Badilita

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

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 7.203 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2550470	Einführung in die Stochastische Optimierung	2 SWS	Lecture (V)	Rebennack
SS 2020	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice (Ü)	Rebennack, Sinske
SS 2020	2550474	Rechnerübung zur Einführung in die Stochastische Optimierung	SWS	Practice (Ü)	Rebennack, Sinske
Exams					
WS 19/20	7900242	Introduction to Stochastic Optimization		Prüfung (PR)	Rebennack

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 7.204 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	Recurrence	Version
Examination of another type	4	Each term	1

Events					
WS 19/20	2123352	IoT platform for engineering	SWS		Ovtcharova, Maier
SS 2020	2123352	IoT platform for engineering	3 SWS	Project (PRO)	Ovtcharova, Maier
Exams					
WS 19/20	76T-MACH-106743	IoT platform for engineering		Prüfung (PR)	Ovtcharova

Competence Certificate
Assessment of another type (graded), procedure see webpage. Number of participants limited to 20 people. There is a participant selection process.

Below you will find excerpts from events related to this course:

V IoT platform for engineering

2123352, WS 19/20, SWS, Language: German, Open in study portal

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 2020, 3 SWS, Language: German, Open in study portal — **Project (PRO)**

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 7.205 Course: IT- Security Law [T-INFO-109910]

Responsible: PD Dr. Oliver Raabe
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	2400007	IT SECURITY LAW	2 SWS	Lecture (V)	Raabe
Exams					
SS 2020	7500228	IT- Security Law		Prüfung (PR)	Raabe

T 7.206 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	6233901	DV-gestützter Straßenentwurf	2 SWS	Lecture / Practice (VÜ)	Zimmermann
Exams					
WS 19/20	8240101804	IT-Based Road Design		Prüfung (PR)	Zimmermann

Competence Certificate
oram exam with 15 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.207 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	Recurrence	Version
Oral examination	4	Each summer term	3

Events					
SS 2020	2118184	IT-Fundamentals of Logistics: Opportunities for Digital Transformation	2 SWS	Lecture (V)	Thomas
Exams					
WS 19/20	76-T-MACH-105187	IT-Fundamentals of Logistics		Prüfung (PR)	Furmans, Mittwollen

Competence Certificate
The assessment consists of an oral exam (30min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Annotation
1) Detailed script can be downloaded online (www.tup.com), updated and enhanced annually.

2) CD-ROM with chapters and exercises at the end of the semester available from the lecturer, also updated and enhanced annually.

Below you will find excerpts from events related to this course:

V IT-Fundamentals of Logistics: Opportunities for Digital Transformation

2118184, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

T 7.208 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	Recurrence	Version
Examination of another type	6	Irregular	1

Events					
SS 2020	2545021	Joint Entrepreneurship School	SWS	Seminar (S)	Terzidis, Ntagiakou

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.

T 7.209 Course: Knowledge Discovery [T-WIWI-102666]

Responsible: Prof. Dr. York Sure-Vetter
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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511302	Knowledge Discovery	2 SWS	Lecture (V)	Sure-Vetter, Färber
WS 19/20	2511303	Exercises to Knowledge Discovery	1 SWS	Practice (Ü)	Sure-Vetter, Färber, Weller
Exams					
WS 19/20	7900013	Knowledge Discovery		Prüfung (PR)	Sure-Vetter
SS 2020	7900039	Knowledge Discovery (Registration until 13 July 2020)		Prüfung (PR)	Sure-Vetter

Competence Certificate
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation.
Students can be awarded a bonus on their final grade if they successfully complete special assignments.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Knowledge Discovery

2511302, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The lecture gives an overview of approaches of machine learning and data mining for knowledge acquisition from large data sets. These are examined especially with respect to algorithms, applicability to different data representations and the use in real application scenarios.
Knowledge Discovery is an established research area with a large community that investigates methods for discovering patterns and regularities in large amounts of data, including unstructured text. A variety of methods exist to extract patterns and provide previously unknown insights. This information can be predictive or descriptive.
The lecture gives an overview of Knowledge Discovery. Specific techniques and methods, challenges and current and future research topics in this research area will be taught.
Contents of the lecture cover the entire machine learning and data mining process with topics on supervised and unsupervised learning and empirical evaluation. Covered learning methods range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

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

V Exercises to Knowledge Discovery

2511303, WS 19/20, 1 SWS, Language: English, Open in study portal

Practice (Ü)

Content
The exercises are based on the lecture Knowledge Discovery. Several exercises are covered, which take up and discuss in detail the topics covered in the lecture Knowledge Discovery. Practical examples are demonstrated to the students to enable a knowledge transfer of the theoretical aspects learned into practical application.
Contents of the lecture cover the entire machine learning and data mining process with topics on monitored and unsupervised learning processes and empirical evaluation. The learning methods covered range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

Learning objectives:

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.

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 7.210 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	Recurrence	Version
Completed coursework	4	Each term	2

Events					
WS 19/20	2183640	Laboratory "Laser Materials Processing"	3 SWS	Practical course (P)	Schneider, Pfleging
SS 2020	2183640	Laboratory "Laser Materials Processing"	3 SWS	Practical course (P)	Schneider, Pfleging
Exams					
WS 19/20	76-T-MACH-102154	Laboratory Laser Materials Processing		Prüfung (PR)	Schneider
SS 2020	76-T-MACH-102154	Laboratory Laser Materials Processing		Prüfung (PR)	Schneider

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 19/20, 3 SWS, Language: German, Open in study portal

Practical course (P)

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.

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 2020, 3 SWS, Language: German, Open in study portal

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.

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 7.211 Course: Laboratory Production Metrology [T-MACH-108878]

Responsible: Dr.-Ing. Benjamin Häfner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Examination of another type	4	Each summer term	1

Events					
SS 2020	2150550	Laboratory Production Metrology	3 SWS	Practical course (P)	Häfner
Exams					
WS 19/20	76-T-MACH-108878	Laboratory Production Metrology		Prüfung (PR)	Häfner

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

2150550, SS 2020, 3 SWS, Language: German, Open in study portal

Practical course (P)

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

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 7.212 Course: Laboratory Work Water Chemistry [T-CIWVT-103351]

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	Version
Examination of another type	4	1

Events					
WS 19/20	22664	Practical course: Water quality and water assessment	2 SWS	Practical course (P)	Horn, Abbt-Braun, und Mitarbeiter
Exams					
WS 19/20	7232002	Laboratory Work Water Chemistry		Prüfung (PR)	Horn, Abbt-Braun
SS 2020	7232002	Laboratory Work Water Chemistry		Prüfung (PR)	Horn, Abbt-Braun

Prerequisites
none

T 7.213 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Exams				
WS 19/20	7900244	Large-scale Optimization	Prüfung (PR)	Rebennack

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 7.214 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	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2020	2182642	Laser in automotive engineering	2 SWS	Lecture (V)	Schneider
Exams					
WS 19/20	76-T-MACH-105164	Laser in Automotive Engineering		Prüfung (PR)	Schneider
SS 2020	76-T-MACH-105164	Laser in Automotive Engineering		Prüfung (PR)	Schneider

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with 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 in automotive engineering

2182642, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 automotive engineering
- economical aspects
- 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

Literature
F. K. Kneubühl, M. W. Sigrist: Laser, 2008, Vieweg+Teubner

H. Hügel, T. Graf: Laser in der Fertigung, 2009, Vieweg+Teubner

T. Graf: Laser - Grundlagen der Laserstrahlquellen, 2009, Vieweg-Teubner Verlag

R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer

J. Eichler, H.-J. Eichler: Laser - Bauformen, Strahlführung, Anwendungen, 2006, Springer

T 7.215 Course: Laser Physics [T-ETIT-100741]

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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2301480	Laserphysics	2 SWS	Lecture (V)	Eichhorn
WS 19/20	2301481	Tutorial for 2301480 Laserphysics	1 SWS	Practice (Ü)	Eichhorn
Exams					
WS 19/20	7301480	Laser Physics		Prüfung (PR)	Eichhorn

Prerequisites
none

T 7.216 Course: Law of Contracts [T-INFO-101316]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law
M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
SS 2020	24671	Law of Contracts	2 SWS	Lecture (V)	Hoff
Exams					
WS 19/20	7500059	Law of Contracts		Prüfung (PR)	Dreier, Matz
SS 2020	7500055	Law of Contracts		Prüfung (PR)	Dreier, Matz

T 7.217 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	6233803	Verkehrs-, Planungs- und Wegerecht	2 SWS	Lecture (V)	Hönig

Competence Certificate
written exam, 60 min.

Prerequisites
None

Recommendation
None

Annotation
None

T 7.218 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	Recurrence	Version
Written examination	4,5	Each term	1

Events					
WS 19/20	6241901	Lean Construction	4 SWS	Lecture / Practice (VÜ)	Haghsheno, Mitarbeiter/innen
Exams					
WS 19/20	8246108000	Lean Construction		Prüfung (PR)	Haghsheno

Competence Certificate
written exam, 70 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.219 Course: Learning Factory “Global Production“ [T-MACH-105783]

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

Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Examination of another type	4	Each winter term	3

Events					
WS 19/20	2149612	Learning Factory “Global Production“	2 SWS		Lanza
Exams					
WS 19/20	76-T-MACH-105783	Learning Factory "Global Production"		Prüfung (PR)	Lanza

Competence Certificate
Alternative test achievement (graded):

- Knowledge acquisition in the context of the seminar (3 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/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

Below you will find excerpts from events related to this course:

V Learning Factory “Global Production“

2149612, WS 19/20, 2 SWS, Language: German, Open in study portal

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

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 7.220 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581998	Liberalised Power Markets	2 SWS	Lecture (V)	Fichtner
Exams					
WS 19/20	7900193	Liberalised Power Markets		Prüfung (PR)	Fichtner

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

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Liberalised Power Markets

2581998, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.221 Course: Life Cycle Assessment [T-WIWI-110512]

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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581995	Life Cycle Assessment	2 SWS	Lecture (V)	Schultmann, Maier
Exams					
WS 19/20	7981995	Life Cycle Assessment		Prüfung (PR)	Schultmann

Competence Certificate
The examination takes place in the form of a written examination (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

Prerequisites
None.

Recommendation
None

Below you will find excerpts from events related to this course:

V Life Cycle Assessment

2581995, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Introduction to life cycle assessment. The lecture describes structure and individual steps of life cycle assessment in detail.

Literature
werden in der Veranstaltung bekannt gegeben

T 7.222 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	Recurrence	Version
Written examination	9	Each summer term	1

Events					
SS 2020	2118078	Logistics and Supply Chain Management	4 SWS	Lecture (V)	Furmans

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

Prerequisites
None

Below you will find excerpts from events related to this course:

V Logistics and Supply Chain Management

2118078, SS 2020, 4 SWS, Language: English, Open in study portal

Lecture (V)

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.

T 7.223 Course: Long-Distance and Air Traffic [T-BGU-106301]

Responsible: 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	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	6232904	Fern- und Luftverkehr	2 SWS	Lecture (V)	Chlond, Dozenten
Exams					
WS 19/20	8245106301	Long-distance and Air Traffic		Prüfung (PR)	Chlond

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.224 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511500	Machine Learning 1 - Fundamental Methods	2 SWS	Lecture (V)	Zöllner
WS 19/20	2511501	Exercises to Machine Learning 1 - Fundamental Methods	1 SWS	Practice (Ü)	Zöllner
Exams					
WS 19/20	7900076	Machine Learning 1 - Basic Methods		Prüfung (PR)	Zöllner
SS 2020	7900154	Machine Learning 1 - Basic Methods (Registration until 13 July 2020)		Prüfung (PR)	Zöllner

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 Machine Learning 1 - Fundamental Methods

2511500, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

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

- 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 7.225 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2511502	Machine Learning 2 - Advanced methods	2 SWS	Lecture (V)	Zöllner
SS 2020	2511503	Exercises for Machine Learning 2 - Advanced Methods	1 SWS	Practice (Ü)	Zöllner
Exams					
WS 19/20	7900050	Machine Learning 2 – Advanced Methods		Prüfung (PR)	Zöllner
SS 2020	7900080	Machine Learning 2 – Advanced Methods (Registration until 13 July 2020)		Prüfung (PR)	Zöllner

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 Machine Learning 2 - Advanced methods

2511502, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. 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 (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

- 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 7.226 Course: Machine Tools and Industrial Handling [T-MACH-102158]

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

Part of: M-MACH-101286 - Machine Tools and Industrial Handling

Type	Credits	Recurrence	Version
Written examination	9	Each winter term	2

Events					
WS 19/20	2149902	Machine Tools and Industrial Handling	6 SWS	Lecture / Practice (VÜ)	Fleischer
Exams					
WS 19/20	76-T-MACH-102158-WING	Machine Tools and Industrial Handling		Prüfung (PR)	Fleischer

Competence Certificate
Written exam (120 minutes)

Prerequisites
"T-MACH-109055 - Werkzeugmaschinen und Handhabungstechnik" must not be commenced.

Below you will find excerpts from events related to this course:

V Machine Tools and Industrial Handling

2149902, WS 19/20, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content
The lecture gives an overview of the construction, use and application of machine tools and industrial handling equipment. In the course of the lecture a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools is conveyed. First, the main components of the machine tools are systematically explained and their design principles as well as the integral machine tool design are discussed. Subsequently, the use and application of machine tools 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.

The individual topics are:

- Frames and frame components
- Feed axes
- Spindles
- Peripheral equipment
- Control unit
- Metrological evaluation and machine testing
- Process monitoring
- Maintenance of machine tools
- Safety assessment of machine tools
- Machine examples

Learning Outcomes:

The students …

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

Workload:

MACH:
regular attendance: 63 hours
self-study: 177 hours
WING:
regular attendance: 63 hours
self-study: 207 hours

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 7.227 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2579900	Management Accounting 1	2 SWS	Lecture (V)	Wouters
SS 2020	2579901	Übung zu Management Accounting 1 (Bachelor)	2 SWS	Practice (Ü)	Riar
SS 2020	2579902		2 SWS	Practice (Ü)	Riar
Exams					
WS 19/20	79-2579900-B	Management Accounting 1 (Bachelor)		Prüfung (PR)	Wouters
WS 19/20	79-2579900-M	Management Accounting 1 (Mastervorzug und Master)		Prüfung (PR)	Wouters

Competence Certificate
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester.

Prerequisites
None

Annotation
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V Management Accounting 1

2579900, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 **Übung zu Management Accounting 1 (Bachelor)** **Practice (Ü)**
2579901, SS 2020, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

V **Practice (Ü)**
2579902, SS 2020, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

T 7.228 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2579903	Management Accounting 2	2 SWS	Lecture (V)	Wouters
WS 19/20	2579904		2 SWS	Practice (Ü)	Ebinger
WS 19/20	2579905		2 SWS	Practice (Ü)	Ebinger
Exams					
WS 19/20	79-2579903-B	Management Accounting 2 (Bachelor)		Prüfung (PR)	Wouters
WS 19/20	79-2579903-M	Management Accounting 2 (Mastervorzug und Master)		Prüfung (PR)	Wouters

Competence Certificate
The assessment consists of a written exam (120 minutes) at the end of each semester.

Prerequisites
None

Recommendation
It is recommended to take part in the course "Management Accounting 1" before this course.

Annotation
Students in the Bachelor' program can only take the related tutorial and examination. Students in the Master's program (and Bachelor's students who are already completing examinations for their Master's program) can only take the related tuturial and examination.

Below you will find excerpts from events related to this course:

V Management Accounting 2

2579903, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 2579904, WS 19/20, 2 SWS, Language: English, Open in study portal **Practice (Ü)**

Content
see ILIAS

V 2579905, WS 19/20, 2 SWS, Language: English, Open in study portal **Practice (Ü)**

Content
see ILIAS

T 7.229 Course: Management of IT-Projects [T-WIWI-102667]

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	Recurrence	Version
Written examination	4,5	Each summer term	3

Events					
SS 2020	2511214	Management of IT-Projects	2 SWS	Lecture (V)	Schätzle
SS 2020	2511215	Übungen zu Management von Informatik-Projekten	1 SWS	Practice (Ü)	Schätzle
Exams					
WS 19/20	7900014	Management of IT-Projects		Prüfung (PR)	Oberweis
SS 2020	7900045	Management of IT-Projects (Registration until 13 July 2020)		Prüfung (PR)	Oberweis

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.

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.

The exact details will be announced in the lecture.

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 Informatik-Projekten

2511215, SS 2020, 1 SWS, Language: German, Open in study portal

Practice (Ü)

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 7.230 Course: Management of Water Resources and River Basins [T-BGU-106597]

Responsible: 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	Recurrence	Version
Examination of another type	6	Each summer term	1

Events					
SS 2020	6224801	Management of Water Resources and River Basins	4 SWS	Lecture / Practice (VÜ)	Ehret

Competence Certificate
course associated assignments, short reports appr. 2 pages each, and final take home exam, report appr. 10 pages and colloquium

Prerequisites
none

Recommendation
none

Annotation
none

T 7.231 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	2545003	Managing New Technologies	2 SWS	Lecture (V)	Reiß
Exams					
WS 19/20	7900189	Managing New Technologies		Prüfung (PR)	Reiß

Competence Certificate
Written exam 100% following §4, Abs. 2.

Prerequisites
None

Recommendation
None

Annotation
The credit points for T-WIWI-102612 "Management of New Technologies" were reduced to 3 credit points in the 2019 summer semester.

Below you will find excerpts from events related to this course:

V Managing New Technologies

2545003, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.232 Course: Manufacturing Technology [T-MACH-102105]

Responsible: Prof. Dr.-Ing. Volker Schulze
Dr.-Ing. Frederik Zanger

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101276 - Manufacturing Technology

Type	Credits	Recurrence	Version
Written examination	9	Each winter term	3

Events					
WS 19/20	2149657	Manufacturing Technology	6 SWS	Lecture / Practice (VÜ)	Schulze, Zanger
Exams					
WS 19/20	76-T-MACH-102105	Manufacturing Technology		Prüfung (PR)	Schulze

Competence Certificate
Written Exam (180 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Manufacturing Technology

2149657, WS 19/20, 6 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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

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 7.233 Course: Market Engineering: Information in Institutions [T-WIWI-102640]

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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2540460	Market Engineering: Information in Institutions	2 SWS	Lecture (V)	Straub
SS 2020	2540461	Übungen zu Market Engineering: Information in Institutions	1 SWS	Practice (Ü)	Golla
Exams					
WS 19/20	7900208	Market Engineering: Information in Institutions (Nachklausur aus SS19)		Prüfung (PR)	Weinhardt

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 Market Engineering: Information in Institutions

2540460, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.234 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

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2571150	Market Research	2 SWS	Lecture (V)	Klarmann
SS 2020	2571151	Market Research Tutorial	1 SWS	Practice (Ü)	Honold
Exams					
WS 19/20	7900217	Market Research		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

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

2571150, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

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 seminar or master thesis positions at the chair of marketing.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.235 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	Recurrence	Version
Written examination	4,5	Each winter term	4

Events					
WS 19/20	2572170	Marketing Analytics	2 SWS	Lecture (V)	Klarmann
WS 19/20	2572171		1 SWS	Practice (Ü)	Halbauer
Exams					
WS 19/20	7900082	Marketing Analytics		Prüfung (PR)	Klarmann
WS 19/20	7900127	Marketing Analytics		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation)

Prerequisites
The prerequisite for taking the course is the successful completion of the course Market Research [2571150].

Recommendation
It is strongly recommended to complete the course Market Research prior to taking the Marketing Analytics course.

Annotation
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 & Sales Research Group.

Below you will find excerpts from events related to this course:

V Marketing Analytics

2572170, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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, structural equation 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.

T 7.236 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
M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each summer term	1

Events					
SS 2020	2571183	Marketing Strategy Business Game	1 SWS	Block (B)	Klarmann, Mitarbeiter

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.

Below you will find excerpts from events related to this course:

V Marketing Strategy Business Game

2571183, SS 2020, 1 SWS, Language: German, Open in study portal

Block (B)

Content
Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups' companies.

Students

- are able to operate the strategic marketing simulation software "Markstrat"

- are able to take strategic marketing decisions in groups

- know how to apply strategic marketing concepts to practical contexts (e.g. for market segmentation, product launches, coordination of the marketing mix, market research, choice of the distribution channel or competitive behavior)

- are capable to collect and to select information usefully with the aim of decision-making

- are able to react appropriately to predetermined market conditions

- know how to present their strategies in a clear and consistent way

- are able to talk about the success, problems, critical incidents, external influences and strategy changes during the experimental game and to reflect and present their learning success

Non exam assessment (following §4(2), 3 of the examination regulation).

The total workload for this course is approximately 45.0 hours. For further information see German version.

- 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 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.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.237 Course: Master Thesis [T-WIWI-103142]

Responsible: Studiendekan der KIT-Fakultät für Informatik
Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101650 - Module Master Thesis

Type	Credits	Version
Final Thesis	30	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 7.238 Course: Material Flow in Logistic Systems [T-MACH-102151]

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

Part of: M-MACH-101277 - Material Flow in Logistic Systems

Type	Credits	Recurrence	Version
Examination of another type	9	Each winter term	3

Events					
WS 19/20	2117051	Material flow in logistic systems	6 SWS	Others (sonst.)	Furmans
Exams					
WS 19/20	76-T-MACH-102151	Material Flow in Logistic Systems		Prüfung (PR)	Furmans

Competence Certificate
The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
  - 40% assessment of the result of the case studies as group work,
  - 20% assessment of the oral examination during the case study colloquiums as individual performance.

A detailed description of the learning control can be found under Annotations.

Prerequisites
none

Recommendation
Recommended elective subject: Probability Theory and Statistics

Annotation
Students are divided into groups for this course. Five case studies are carried out in these groups. The results of the group work during the lecture period are presented and evaluated in writing. In the oral examination during the case study colloquiums, the understanding of the result of the group work and the models dealt with in the course is tested. The participation in the oral defenses is compulsory and will be controlled. For the written submission the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

Below you will find excerpts from events related to this course:

V Material flow in logistic systems

2117051, WS 19/20, 6 SWS, Language: German, Open in study portal

Others (sonst.)

Content
Learning Content:

- Elements of material flow systems (conveyor elements, fork, join elements)
- Models of material flow networks using graph theory and matrices
- Queueing theory, calculation of waiting time, utilization
- Warehouseing and order-picking
- Shuttle systems
- Sorting systems
- Simulation
- Calculation of availability and reliability
- Value stream analysis

After successful completion of the course, you are able (alone and in a team) to:

- Accurately describe a material handling system in a conversation with an expert.
- Model and parameterize the system load and the typical design elements of a material handling system.
- Design a material handling system for a task.
- Assess the performance of a material handling system in terms of the requirements.
- Change the main lever for influencing the performance.
- Expand the boundaries of today's methods and system components conceptually if necessary.

Literature:

Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 2009

Description:

Students are divided into groups for this course. Five case studies are carried out in these groups. The results of the group work during the lecture period are presented and evaluated in writing. During the colloquiums, the result of the case study is presented and the understanding of the group work and the models dealt with in the course are tested in an oral defense. The participation in the colloquiums is compulsory and will be controlled. For the written submission and the presentation the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

We strongly recommend to attend the introductory session at 16.10.2019. In this session, the teaching concept of "Materialfluss in Logistiksysteme" is explained and outstanding issues are clarified.

Workload:

- Regular attendance: 35 h
- Self-study: 135 h
- Group work: 100 h

Competence Certificate:

The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
    - 40% assessment of the result and the presentation of the case studies as group work,
    - 20% assessment of the oral examination during the colloquiums as individual performance.

T 7.239 Course: Mathematical Models and Methods for Production Systems [T-MACH-105189]

Responsible: 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	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	2117059	Mathematical models and methods for Production Systems	4 SWS	Lecture (V)	Baumann, Furmans
Exams					
WS 19/20	76-T-MACH-105189	Mathematical models and methods for Production Systems		Prüfung (PR)	Furmans

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 19/20, 4 SWS, Language: English, Open in study portal — **Lecture (V)**

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

Literature
Wolff: Stochastic Modeling and the Theory of Queues, Prentice Hall, 1989
Shanthikumar, Buzacott: Stochastic Models of Manufacturing Systems

T 7.240 Course: Metal Forming [T-MACH-105177]

Responsible: Dr. Thomas Herlan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2150681	Metal Forming	2 SWS	Lecture (V)	Herlan
Exams					
WS 19/20	76-T-MACH-105177	Metal Forming		Prüfung (PR)	Herlan
WS 19/20	76-T-MACH-105177-Wdh	Metal Forming - re-examination		Prüfung (PR)	Herlan

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Metal Forming

2150681, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.241 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	6232701	Berechnungsverfahren und Modelle in der Verkehrsplanung	2 SWS	Lecture / Practice (VÜ)	Vortisch, Mitarbeiter/ innen
Exams					
WS 19/20	8240101797	Methods and Models in Transportation Planning		Prüfung (PR)	Vortisch

Prerequisites
None

Recommendation
None

Annotation
None

T 7.242 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	Recurrence	Version
Examination of another type	1,5	Each summer term	2

Events					
SS 2020	2560240	Methods in Economic Dynamics	SWS	Lecture (V)	Ott, Bälz

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 2020, SWS, Language: German/English, Open in study portal

Lecture (V)

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).

Literature
Relevante Literatur wird in der Vorlesung bekanntgegeben.
(Relevant literature will be announced in the lecture.)

T 7.243 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar (S)	Koch
Exams					
WS 19/20	7900143	Methods in Innovation Management		Prüfung (PR)	Weissenberger-Eibl

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.

Below you will find excerpts from events related to this course:

V Methoden im Innovationsmanagement

2545107, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 7.244 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-ETIT-101159 - Sensor Technology II
M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS
M-MACH-101292 - Microoptics

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	2142881	Microactuators	2 SWS	Lecture (V)	Kohl
Exams					
WS 19/20	76-T-MACH-101910	Microactuators		Prüfung (PR)	Kohl

Competence Certificate
written exam, 60 min.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Microactuators

2142881, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.245 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
WS 19/20	2550138	Mixed-integer Programming I	2 SWS	Lecture (V)	Stein
WS 19/20	2550139	Exercises Mixted Integer Programming I	SWS	Practice (Ü)	Stein
Exams					
WS 19/20	7900008_WS1920_HK	Mixed Integer Programming I		Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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

2550138, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 *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.

T 7.246 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	Recurrence	Version
Written examination	4,5	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 examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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).

T 7.247 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	Recurrence	Version
Oral examination	9	Each summer term	1

Events					
SS 2020	2114073	Mobile Machines	4 SWS	Lecture (V)	Geimer, Geiger
Exams					
WS 19/20	76T-MACH-105168	Mobile Machines		Prüfung (PR)	Geimer
WS 19/20	76-T-MACH-105168	Mobile Machines		Prüfung (PR)	Geimer
SS 2020	76T-MACH-105168	Mobile Machines		Prüfung (PR)	Geimer
SS 2020	76-T-MACH-105168	Mobile Machines		Prüfung (PR)	Geimer

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 2020, 4 SWS, Language: German, Open in study portal

Lecture (V)

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 7.248 Course: Mobility Services and new Forms of Mobility [T-BGU-103425]

Responsible: 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6232811	Mobilitätsservices und neue Formen der Mobilität	2 SWS	Lecture / Practice (VÜ)	Kagerbauer
Exams					
WS 19/20	8240103425	Mobility Services and new Forms of Mobility		Prüfung (PR)	Kagerbauer

Prerequisites
None

Recommendation
None

Annotation
None

T 7.249 Course: Model Based Application Methods [T-MACH-102199]

Responsible: Dr. Frank Kirschbaum
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Combustion Engines II

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Competence Certificate
take-home exam, short presentation with oral examination

Prerequisites
none

T 7.250 Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

Responsible: Dr. Verena Dorner
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103118 - Data Science: Data-Driven User Modeling

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2540470	Modeling and Analyzing Consumer Behavior with R	2 SWS	Lecture (V)	Dorner, Greif-Winzrieth, Knierim
SS 2020	2540471	Übung zu Modeling and Analyzing Consumer Behaviour with R	1 SWS	Practice (Ü)	Knierim, Greif-Winzrieth, Dorner
Exams					
WS 19/20	7900262	Modeling and Analyzing Consumer Behavior with R (Nachklausur aus dem SS19)		Prüfung (PR)	Weinhardt

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
Number of participants limited.

Below you will find excerpts from events related to this course:

V Modeling and Analyzing Consumer Behavior with R

2540470, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Field, A., Miles, J., Field, Z., Discovering Statistics Using R, SAGE 2014

Jones, O., Maillardet, R., Robinson, A., Scientific Programming and Simulation Using R, Chapmann & Hall / CRC Press 2009

Venables, W.N., Smith, D.M. and the R Core Team, "An Introduction to R", 2012 (Version 2.15.2), http://cran.r-project.org/doc/manuals/R-intro.pdf

Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)

T 7.251 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	Recurrence	Version
Examination of another type	4,5	Each winter term	2

Events					
WS 19/20	2550490	Modellieren und OR-Software: Fortgeschrittene Themen	3 SWS	Practical course (P)	Pomes, Zander, Bakker
Exams					
WS 19/20	00019	Modeling and OR-Software: Advanced Topics		Prüfung (PR)	Nickel

Competence Certificate
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the software laboratory and the following term.

Prerequisites
None.

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 19/20, 3 SWS, Language: German, Open in study portal

Practical course (P)

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.

T 7.252 Course: Morphodynamics [T-BGU-101859]

Responsible: Prof. Dr. Franz Nestmann
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

Type	Credits	Version
Oral examination	3	1

Events					
SS 2020	6222805	Morphodynamics	2 SWS	Lecture / Practice (VÜ)	Nestmann

Competence Certificate
See German version.

Prerequisites
None

T 7.253 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2550554	Multivariate Verfahren	2 SWS	Lecture (V)	Grothe
SS 2020	2550555	Übung zu Multivariate Verfahren	2 SWS	Practice (Ü)	Grothe, Kächele

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).

The exam is offered every semester. Re-examinations are offered only for repeaters.

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.

Below you will find excerpts from events related to this course:

V Multivariate Verfahren

2550554, SS 2020, 2 SWS, Open in study portal — **Lecture (V)**

Literature
Skript zur Vorlesung

T 7.254 Course: Nanotechnology for Engineers and Natural Scientists [T-MACH-105180]

Responsible: Prof. Dr. Martin Dienwiebel
PD Dr. Hendrik Hölscher
Stefan Walheim

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2020	2142861	Nanotechnology for Engineers and Natural Scientists	2 SWS	Lecture (V)	Hölscher, Dienwiebel
Exams					
WS 19/20	76-T-MACH-105180	Nanotechnology for Engineers and Natural Scientists		Prüfung (PR)	Hölscher, Dienwiebel

Competence Certificate
written exam 90 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V Nanotechnology for Engineers and Natural Scientists

2142861, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
1) Introduction into nanotechnology
2) History of scanning probe techniques
3) Scanning tunneling microscopy (STM)
4) Atomic force microscopy (AFM)
5) Dynamic Modes (DFM, ncAFM, MFM, KPFM, ...)
6) Friction force microscopy & nanotribology
7) Nanolithography
8) Other families of the SPM family

The student can

- explain the most common measurement principles of nanotechnology especialy scanning probe methods and is able to use them for the characterisation of chemical and physical properties of surfaces
- decribe interatomic forces and their influence on nanotechnology
- describe methods of micro- and nanofabrication and of –nanolithography
- explain simple models used in contact mechanics and nanotribology
- describe basic concepts used for nanoscale components

preliminary knowlegde in mathematics and physics

lectures 30 h

self study 30 h

preparation for examination 30 h

The successfull attandence of the lecture is controlled by a 30 minutes written examination, and a subsequent oral examination (20 min). Passing the written exam is mandantory for the participation of the oral examination. The grade result is the result of the oral exam.

Literature

1. Tafelbilder, Folien, Skript
2. Scanning Probe Microscopy – Lab on a Tip: Meyer, Hug, Bennewitz, Springer (2003)

T 7.255 Course: Nanotechnology with Clusterbeams [T-MACH-102080]

Responsible: Dr. Jürgen Gspann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101294 - Nanotechnology

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Competence Certificate
written examination
presence in more that 70% of the lectures
Duration: 1 h

aids: none

Prerequisites
none

T 7.256 Course: Nanotribology and -Mechanics [T-MACH-102167]

Responsible: Prof. Dr. Martin Dienwiebel
PD Dr. Hendrik Hölscher

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Microfabrication
M-MACH-101294 - Nanotechnology

Type	Credits	Recurrence	Version
Examination of another type	3	Each summer term	4

Events					
WS 19/20	2182712	Nanotribology and -Mechanics	2 SWS	Block (B)	Dienwiebel
SS 2020	2182712	Nanotribology and -Mechanics	2 SWS	Lecture / Practice (VÜ)	Dienwiebel

Competence Certificate
presentation (40%) and colloquium (30 min, 60%)

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics and physics

Below you will find excerpts from events related to this course:

V Nanotribology and -Mechanics

2182712, WS 19/20, 2 SWS, Language: English, Open in study portal

Block (B)

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

Literature
Tafelbilder, Folien, Kopien von Artikeln

V

Nanotribology and -Mechanics

2182712, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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

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 7.257 Course: Nature-Inspired Optimization Methods [T-WIWI-102679]

Responsible: Dr. rer. nat. 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2511106	Nature-Inspired Optimization Methods	2 SWS	Lecture (V)	Shukla
SS 2020	2511107	Übungen zu Nature-Inspired Optimization Methods	1 SWS	Practice (Ü)	Shukla
Exams					
WS 19/20	7900016	Nature-Inspired Optimisation Methods		Prüfung (PR)	Shukla
SS 2020	7900026	Nature-Inspired Optimization Methods (Registration until 13 July 2020)		Prüfung (PR)	Shukla

Competence Certificate
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called “bonus exam”, 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exersices . The bonus exam may be split into several shorter written tests.

The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Nature-Inspired Optimization Methods

2511106, SS 2020, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

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 7.258 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
WS 19/20	2521300	Non- and Semiparametrics	2 SWS	Lecture (V)	Schienle
WS 19/20	2521301		2 SWS	Practice (Ü)	Schienle, Görgen
Exams					
WS 19/20	7900223	Non- and Semiparametrics		Prüfung (PR)	Schienle
WS 19/20	7900227	Non- and Semiparametrics		Prüfung (PR)	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 19/20, 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 7.259 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	Recurrence	Version
Written examination	4,5	Each winter term	4

Events					
WS 19/20	2550111	Nonlinear Optimization I	2 SWS	Lecture (V)	Stein
WS 19/20	2550112	Exercises Nonlinear Optimization I + II	SWS	Practice (Ü)	Stein
Exams					
WS 19/20	7900002_WS1920_HK	Nonlinear Optimization I		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation.

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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, SpringerSpektrum, 2018

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 7.260 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	Recurrence	Version
Written examination	9	Each winter term	6

Events					
WS 19/20	2550111	Nonlinear Optimization I	2 SWS	Lecture (V)	Stein
WS 19/20	2550112	Exercises Nonlinear Optimization I + II	SWS	Practice (Ü)	Stein
WS 19/20	2550113	Nonlinear Optimization II	2 SWS	Lecture (V)	Stein
Exams					
WS 19/20	7900004_WS1920_HK	Nonlinear Optimization I and II		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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, SpringerSpektrum, 2018

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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, SpringerSpektrum, 2018

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 7.261 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	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2550112	Exercises Nonlinear Optimization I + II	SWS	Practice (Ü)	Stein
WS 19/20	2550113	Nonlinear Optimization II	2 SWS	Lecture (V)	Stein
Exams					
WS 19/20	7900003_WS1920_HK	Nonlinear Optimization II		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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, SpringerSpektrum, 2018

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 7.262 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	Recurrence	Version
Written examination	4	Each winter term	3

Events					
WS 19/20	2141865	Novel actuators and sensors	2 SWS	Lecture (V)	Kohl, Sommer
Exams					
WS 19/20	76-T-MACH-102152	Novel Actuators and Sensors		Prüfung (PR)	Kohl, Sommer

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.263 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	Recurrence	Version
Oral examination	1,5	Each winter term	1

Events					
WS 19/20	6241905	Erdbau	1 SWS	Lecture (V)	Haghsheno, Mitarbeiter/innen
Exams					
WS 19/20	8240101801	Operation Methods for Earthmoving		Prüfung (PR)	Schneider

Prerequisites
None

Recommendation
None

Annotation
None

T 7.264 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	Recurrence	Version
Oral examination	1,5	Each winter term	1

Events					
WS 19/20	6241904	Tiefbau	1 SWS	Lecture (V)	Haghsheno, Schneider
Exams					
WS 19/20	8240101832	Operation Methods for Foundation and Marine Construction		Prüfung (PR)	Schneider

Prerequisites
None

Recommendation
None

Annotation
None

T 7.265 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	Recurrence	Version
Written examination	4,5	Irregular	2

Events					
SS 2020	2550495	Operations Research in Health Care Management	2 SWS	Lecture (V)	Nickel
SS 2020	2550496	Übungen zu OR im Health Care Management	1 SWS	Practice (Ü)	Bakker

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.266 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	Recurrence	Version
Written examination	4,5	Irregular	2

Exams				
WS 19/20	7900288	Operations Research in Supply Chain Management	Prüfung (PR)	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 7.267 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	Recurrence	Version
Oral examination	6	Each winter term	2

Events					
WS 19/20	2309460	Optical Transmitters and Receivers	2 SWS	Lecture (V)	Freude
WS 19/20	2309461	Tutorial for 2309460 Optical Transmitters and Receivers	2 SWS	Practice (Ü)	Freude
Exams					
WS 19/20	7309460	Optical Transmitters and Receivers		Prüfung (PR)	Freude
WS 19/20	7309460-w	Optical Transmitters and Receivers (Wiederholung)		Prüfung (PR)	Freude

Prerequisites
none

T 7.268 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2309464	Optical Waveguides and Fibers	2 SWS	Lecture (V)	Koos
WS 19/20	2309465	Tutorial for 2309464 Optical Waveguides and Fibers	1 SWS	Practice (Ü)	Koos
Exams					
WS 19/20	7309464	Optical Waveguides and Fibers		Prüfung (PR)	Koos

Prerequisites
none

T 7.269 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2550140	Optimization Models and Application	2 SWS	Lecture (V)	Stein, Sudermann-Merx
Exams					
WS 19/20	7900010_WS1920_HK	Optimization Models and Applications		Prüfung (PR)	Stein

Competence Certificate
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.

T 7.270 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2550464	Optimierungsansätze unter Unsicherheit	SWS	Lecture (V)	Rebennack
WS 19/20	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	SWS	Practice (Ü)	Rebennack, Füllner
WS 19/20	2550466		2 SWS	Practice (Ü)	Rebennack, Füllner
Exams					
WS 19/20	7900240	Optimization under Uncertainty		Prüfung (PR)	Rebennack
WS 19/20	7900330	Optimization under Uncertainty		Prüfung (PR)	Rebennack

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 7.271 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2309486	Optoelectronic Components	2 SWS	Lecture (V)	Freude
SS 2020	2309487	Optoelectronic Components (Tutorial)	1 SWS	Practice (Ü)	Freude
Exams					
WS 19/20	7309486	Optoelectronic Components		Prüfung (PR)	Freude
WS 19/20	7309486-W	Optoelectronic Components (Wiederholungsprüfung)		Prüfung (PR)	Freude

Prerequisites
none

T 7.272 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2520320	Panel Data	2 SWS	Lecture (V)	Heller
SS 2020	2520321	Übungen zu Paneldaten	2 SWS	Practice (Ü)	Heller

Prerequisites
None

Below you will find excerpts from events related to this course:

V Panel Data

2520320, SS 2020, 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 7.273 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	Recurrence	Version
Written examination	4,5	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 examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

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 7.274 Course: Patent Law [T-INFO-101310]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	24656	Patent Law	2 SWS	Lecture (V)	Koch
Exams					
WS 19/20	7500001	Patent Law		Prüfung (PR)	Dreier, Matz
SS 2020	7500062	Patent Law		Prüfung (PR)	Dreier, Matz

T 7.275 Course: Personalization and Services [T-WIWI-102848]

Responsible: Dr.-Ing. Andreas Sonnenbichler
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2540533	Personalization & Services	2 SWS	Lecture (V)	Sonnenbichler, Geyer-Schulz
WS 19/20	2540534	Exercise Personalization & Services	1 SWS	Practice (Ü)	Sonnenbichler, Geyer-Schulz
Exams					
WS 19/20	7979702	Personalization and Services		Prüfung (PR)	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

Recommendation
None

Below you will find excerpts from events related to this course:

V Personalization & Services

2540533, WS 19/20, 2 SWS, Language: German, Open in study portal **Lecture (V)**

Literature
Die Vorlesung orientiert sich an aktuellen wissenschaftlichen Veröffentlichungen. Die Literaturliste finden Sie nach Themen gegliedert jeweils am Ende der Vorlesungseinheiten.

T 7.276 Course: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

T 7.277 Course: PH APL-ING-TL02 [T-WIWI-106292]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

T 7.278 Course: PH APL-ING-TL03 [T-WIWI-106293]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

T 7.279 Course: PH APL-ING-TL04 ub [T-WIWI-106294]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Recurrence	Version
Completed coursework	0	Once	1

T 7.280 Course: PH APL-ING-TL05 ub [T-WIWI-106295]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Recurrence	Version
Completed coursework	0	Once	1

T 7.281 Course: PH APL-ING-TL06 ub [T-WIWI-106296]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Recurrence	Version
Completed coursework	0	Once	1

T 7.282 Course: PH APL-ING-TL07 [T-WIWI-108384]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

T 7.283 Course: Photovoltaic System Design [T-ETIT-100724]

Responsible: Robin Grab
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101164 - Generation and Transmission of Renewable Power

Type	Credits	Recurrence	Version
Written examination	3	Each term	1

Events					
SS 2020	2307380	Photovoltaische Systemtechnik	2 SWS	Lecture (V)	Grab

Prerequisites
none

T 7.284 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	Recurrence	Version
Oral examination	5	Each winter term	3

Events					
WS 19/20	2181612	Physical basics of laser technology	3 SWS	Lecture / Practice (VÜ)	Schneider
Exams					
WS 19/20	76-T-MACH-102102	Physical Basics of Laser Technology		Prüfung (PR)	Schneider
SS 2020	76-T-MACH-102102	Physical Basics of Laser Technology		Prüfung (PR)	Schneider

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with 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 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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. An excursion to the laser laboratory of the Institute for Applied Materials (IAM) will be offered.

- 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.

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, Cambridge University Press

W. M. Steen: Laser Material Processing, 2010, Springer

T 7.285 Course: Physics for Engineers [T-MACH-100530]

Responsible: Prof. Dr. Martin Dienwiebel
Prof. Dr. Peter Gumbsch
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	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2020	2142890	Physics for Engineers	2 SWS	Lecture (V)	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch
Exams					
WS 19/20	76-T-MACH-100530	Physics for Engineers		Prüfung (PR)	Gumbsch, Dienwiebel, Nesterov-Müller, Weygand

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 (2142891, 2 SWS) 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 2142891)
self-study: 97,5 hours and 49 hours (excerises 2142891)

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

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 7.286 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	Recurrence	Version
Written examination	5,5	Each winter term	1

Events					
WS 19/20	2581952	Planning and Management of Industrial Plants	2 SWS	Lecture (V)	Glöser-Chahoud, Schultmann
WS 19/20	2581953	Übungen Anlagenwirtschaft	2 SWS	Practice (Ü)	Rosenberg, Schultmann
Exams					
WS 19/20	7981952	Planning and Management of Industrial Plants		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of a written exam (90 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
None

Below you will find excerpts from events related to this course:

V Planning and Management of Industrial Plants

2581952, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.287 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	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
WS 19/20	2122376	PLM for product development in mechatronics	SWS	Lecture (V)	Eigner
SS 2020	2122376	PLM for product development in mechatronics	SWS	Lecture (V)	Eigner
Exams					
WS 19/20	76-T-MACH-102181	PLM for Product Development in Mechatronics		Prüfung (PR)	Eigner

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 19/20, SWS, Language: German, Open in study portal

Lecture (V)

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

Literature
Vorlesungsfolien / lecture slides

V PLM for product development in mechatronics

2122376, SS 2020, SWS, Language: German, Open in study portal

Lecture (V)

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

Literature
Vorlesungsfolien / lecture slides

T 7.288 Course: PLM-CAD Workshop [T-MACH-102153]

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	Recurrence	Version
Examination of another type	4	Each term	2

Events					
WS 19/20	2121357	PLM-CAD Workshop	4 SWS	Project (PRO)	Ovtcharova, Mitarbeiter
SS 2020	2121357	PLM-CAD Workshop	4 SWS	Project (PRO)	Ovtcharova, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-102153	PLM-CAD Workshop		Prüfung (PR)	Ovtcharova

Competence Certificate
Alternative exam assessment (graded)

Prerequisites
None

Annotation
Number of participants is limited, compulsory attendance

Below you will find excerpts from events related to this course:

V PLM-CAD Workshop

2121357, WS 19/20, 4 SWS, Language: German, Open in study portal

Project (PRO)

Content
The aim of the workshop is to demonstrate the benefits of collaborative product development using PLM methods and to emphasize their added value compared to classical CAD development.

Students learn how to develop and produce a prototype with the help of modern PLM and CAx systems.

Literature
Workshop-Unterlagen / workshop materials

V PLM-CAD Workshop

2121357, SS 2020, 4 SWS, Language: German, Open in study portal

Project (PRO)

Content
The aim of the workshop is to demonstrate the benefits of collaborative product development using PLM methods and to emphasize their added value compared to classical CAD development.

Students learn how to develop and produce a prototype with the help of modern PLM and CAx systems.

Literature
Workshop-Unterlagen / workshop materials

T 7.289 Course: Plug-and-play Material Handling [T-MACH-106693]

Responsible: Jonathan Dziedzitz
Prof. Dr.-Ing. Kai Furmans

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Recurrence	Version
Completed coursework	4	Each winter term	2

Events					
WS 19/20	2117070	Plug-and-play material handling	2 SWS	Practical course (P)	Furmans, Dziedzitz

Competence Certificate
Presentation of the four steps of the course content (design, implementation, test concept and evaluation)

Prerequisites
None

T 7.290 Course: Polymer Engineering I [T-MACH-102137]

Responsible: Prof. Dr.-Ing. Peter Elsner
Dr.-Ing. Wilfried Liebig

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2173590	Polymer Engineering I	2 SWS	Lecture (V)	Elsner, Liebig
Exams					
WS 19/20	76-T-MACH-102137	Polymer Engineering I		Prüfung (PR)	Elsner
SS 2020	76-T-MACH-102137	Polymer Engineering I		Prüfung (PR)	Elsner, Liebig

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.291 Course: Polymer Engineering II [T-MACH-102138]

Responsible: Prof. Dr.-Ing. Peter Elsner
Dr.-Ing. Wilfried Liebig

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2174596	Polymer Engineering II	2 SWS	Lecture (V)	Elsner, Liebig
Exams					
WS 19/20	76-T-MACH-102138	Polymerengineering II		Prüfung (PR)	Elsner
SS 2020	76-T-MACH-102138	Polymerengineering II		Prüfung (PR)	Elsner, Liebig

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

2174596, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.292 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2141853	Polymers in MEMS A: Chemistry, Synthesis and Applications	2 SWS		Rapp
Exams					
WS 19/20	76-T-MACH-102192	Polymers in MEMS A: Chemistry, Synthesis and Applications	Prüfung (PR)		Rapp, Worgull

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 19/20, 2 SWS, Language: German, Open in study portal

T 7.293 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2141854	Polymers in MEMS B: Physics, Microstructuring and Applications	2 SWS	Lecture (V)	Worgull
Exams					
WS 19/20	76-T-MACH-102191	Polymers in MEMS B: Physics, Microstructuring and Applications		Prüfung (PR)	Worgull

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

T 7.294 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2142855	Polymers in MEMS C - Biopolymers and Bioplastics	2 SWS		Worgull, Rapp

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 2020, 2 SWS, Language: German, Open in study portal

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, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu) and PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

Literature
Zusätzliche vorlesungsbegleitende Literatur ist nicht notwendig.

T 7.295 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2520357	Portfolio and Asset Liability Management	2 SWS	Lecture (V)	Safarian
SS 2020	2520358	Übungen zu Portfolio and Asset Liability Management	2 SWS	Practice (Ü)	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 2020, 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

Literature
To be announced in the lecture

T 7.296 Course: Power Network [T-ETIT-100830]

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	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	2307371	Power Network	2 SWS	Lecture (V)	Leibfried
WS 19/20	2307373	Tutorial for 2307371 Power Network	2 SWS	Practice (Ü)	Hirsching, Leibfried
Exams					
WS 19/20	7307371	Power Network		Prüfung (PR)	Leibfried

T 7.297 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	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2307372	Power Transmission and Power Network Control	2 SWS	Lecture (V)	Leibfried
SS 2020	2307374	Übungen zu 2307372 Energieübertragung und Netzregelung	1 SWS	Practice (Ü)	Nowak
Exams					
WS 19/20	7307372	Power Transmission and Power Network Control		Prüfung (PR)	Leibfried

Prerequisites
none

T 7.298 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	Recurrence	Version
Completed coursework	3	Each summer term	1

Events					
SS 2020	2142856	Practical Course Polymers in MEMS	2 SWS	Block (B)	Worgull, Rapp

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 2020, 2 SWS, Language: German, Open in study portal

Block (B)

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 the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu) and PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is mandatory. The number of participants is limited to 5 students.

Literature
Vorlesungsunterlagen, dort empfohlene Literatur

T 7.299 Course: Practical Course Technical Ceramics [T-MACH-105178]

Responsible: Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Completed coursework	1	Each winter term	1

Events					
WS 19/20	2125751	Practical Course Technical Ceramics	2 SWS	Practical course (P)	Schell
Exams					
WS 19/20	76-T-MACH-105178	Practical Course Technical Ceramics		Prüfung (PR)	Schell

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 19/20, 2 SWS, Language: German, Open in study portal

Practical course (P)

Literature
Salmang, H.: Keramik, 7. Aufl., Springer Berlin Heidelberg, 2007. - Online-Ressource

Richerson, D. R.: Modern Ceramic Engineering, CRC Taylor & Francis, 2006

T 7.300 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	Recurrence	Version
Examination of another type	4,5	Irregular	1

Events					
WS 19/20	2540554	Practical Seminar: Information Systems & Service Design	2 SWS	Lecture (V)	Mädche
SS 2020	2540554	Practical Seminar: Information Systems & Service Design (Master)	3 SWS	Lecture (V)	Mädche

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 — Lecture (V)

2540554, WS 19/20, 2 SWS, Language: English, Open in study portal

V Practical Seminar: Information Systems & Service Design (Master) — Lecture (V)

2540554, SS 2020, 3 SWS, Open in study portal

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.

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

T 7.301 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	Recurrence	Version
Examination of another type	4,5	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 7.302 Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Gerhard Satzger
Prof.Dr. Thomas Setzer
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Type	Credits	Recurrence	Version
Examination of another type	4,5	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 7.303 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	Recurrence	Version
Examination of another type	4,5	Each term	2

Events					
SS 2020	2550498	Practical seminar: Health Care Management	3 SWS	Practical course (P)	Nickel, Mitarbeiter

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 7.304 Course: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104068 - Information Systems in Organizations
M-WIWI-104080 - Designing Interactive Information Systems

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each term	2

Events					
SS 2020	2540554	Practical Seminar: Information Systems & Service Design (Master)	3 SWS	Lecture (V)	Mädche
Exams					
WS 19/20	7900332	Practical Seminar: Information Systems and Service Design		Prüfung (PR)	Mädche

Competence Certificate
The assessment of this course is according to §4(2), 3 SPO 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 (e.g. implementation of a prototype) 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). In the winter terms, the course is only offered as a seminar.

Prerequisites
None.

Recommendation
Attending the course „Digital Service Design“ is recommended, but not mandatory.

Annotation
The course is held in English.

Below you will find excerpts from events related to this course:

V Practical Seminar: Information Systems & Service Design (Master)

2540554, SS 2020, 3 SWS, Open in study portal — **Lecture (V)**

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.

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.

T 7.305 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	Recurrence	Version
Examination of another type	4,5	Irregular	1

Events					
WS 19/20	2595477	Seminarpraktikum: Service Innovation	3 SWS	Seminar (S)	Satzger

Competence Certificate
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical 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 of Service Innovation Methods is assumed. Therefore it is recommended 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 7.306 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-ETIT-101159 - Sensor Technology II
M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS
M-MACH-101291 - Microfabrication
M-MACH-101292 - Microoptics
M-MACH-101294 - Nanotechnology

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course (P)	Last
WS 19/20	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course (P)	Last
SS 2020	2143875	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course (P)	Last
SS 2020	2143877	Introduction to Microsystem Technology - Practical Course	2 SWS	Practical course (P)	Last
Exams					
WS 19/20	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology		Prüfung (PR)	Last
SS 2020	76-T-MACH-102164	Practical Training in Basics of Microsystem Technology		Prüfung (PR)	Last

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

2143875, WS 19/20, 2 SWS, Language: German, Open in study portal

Practical course (P)

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

2143877, WS 19/20, 2 SWS, Language: German, Open in study portal

Practical course (P)

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

2143875, SS 2020, 2 SWS, Language: German, Open in study portal

Practical course (P)

Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
3. Mikro optics: "LIGA-micro spectrometer"
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
9. Atomic force microscopy
Each student takes part in only five experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

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

2143877, SS 2020, 2 SWS, Language: German, Open in study portal

Practical course (P)

Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
3. Mikro optics: "LIGA-micro spectrometer"
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
9. Atomic force microscopy
Each student takes part in only five experiments.
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ' Grundlagen der Mikrosystemtechnik'

T 7.307 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
WS 19/20	2520402	Predictive Mechanism and Market Design	2 SWS	Lecture (V)	Reiß
WS 19/20	2520403		SWS	Practice (Ü)	Reiß
Exams					
WS 19/20	7900318	Predictive Mechanism and Market Design		Prüfung (PR)	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 7.308 Course: Predictive Modeling [T-WIWI-110868]

Responsible: Jun.-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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2521311	Predictive Modeling	2 SWS	Lecture (V)	Krüger
SS 2020	2521312	Predictive Modeling (Tutorial)	2 SWS	Practice (Ü)	Krüger

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 through an additional performance (short presentation). 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). Details will be announced in the lecture.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Predictive Modeling
2521311, SS 2020, 2 SWS, Language: English, Open in study portal
Lecture (V)

Literature

- Elliott, G., und A. Timmermann (Hsg.): "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.
- Hansen, B.E.: "Econometrics", Online-Text (https://www.ssc.wisc.edu/~bhansen/econometrics), 2020.
- 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 2020, 2 SWS, Language: English, Open in study portal
Practice (Ü)

T 7.309 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2540529	Price Management	2 SWS	Lecture (V)	Glenn
SS 2020	2540530	Exercise Price Management	1 SWS	Practice (Ü)	Glenn

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.310 Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

Responsible: Prof. Dr. Martin Klarmann
Mark Schröder
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Each winter term	3

Events					
WS 19/20	2572198	Price Negotiation and Sales Presentations	1 SWS	Block (B)	Klarmann, Schröder
Exams					
WS 19/20	7900148	Price Negotiation and Sales Presentations		Prüfung (PR)	Klarmann

Competence Certificate
This alternative exam assessment consists of a presentation with a subsequent discussion totalling 25 minutes. Moreover learning contents are checked by realistic 30-minute price negotiations.

Prerequisites
None

Recommendation
None

Annotation
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 & 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 courses from the election block can be attended in the module.

Below you will find excerpts from events related to this course:

V Price Negotiation and Sales Presentations

2572198, WS 19/20, 1 SWS, Language: German, Open in study portal **Block (B)**

Content
At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

Students

- gain a clear impression of the theoretical knowledge about price negotiations and sales presentations
- improve their own negotiation abilities

Non exam assessment (following §4(2), 3 of the examination regulation).

The total workload for this course is approximately 45.0 hours. For further information see German version.

- In order to participate in this course, you need to apply. Applications usually start with the lecture period in the winter term. Detailed information on the application process is provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the 1.5 ECTS courses 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 in the respective module to all students. Participation in a specific course cannot be guaranteed.

T 7.311 Course: Pricing [T-WIWI-102883]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2572157	Pricing	2 SWS	Lecture (V)	Klarmann
WS 19/20	2572169	Übung zu Pricing	1 SWS	Practice (Ü)	Moosbrugger
Exams					
WS 19/20	7900138	Pricing		Prüfung (PR)	Klarmann
WS 19/20	7900286	Pricing		Prüfung (PR)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Pricing

2572157, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

The total workload for this course is approximately 135.0 hours. For further information see German version.

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Literature
Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

Simon, Hermann, Fassnacht, Martin (2008), Preismanagement, 3. Aufl., Wiesbaden.

T 7.312 Course: Principles of Ceramic and Powder Metallurgy Processing [T-MACH-102111]

Responsible: Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2193010	Basic principles of powder metallurgical and ceramic processing	2 SWS	Lecture (V)	Schell
Exams					
WS 19/20	76-T-MACH-102111	Principles of Ceramic and Powder Metallurgy Processing		Prüfung (PR)	Schell

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 19/20, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

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 7.313 Course: Principles of Food Process Engineering [T-CIWVT-101874]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101120 - Principles of Food Process Engineering

Type	Credits	Version
Oral examination	9	1

Events					
WS 19/20	22207	Lebensmittelkunde und -funktionalität	2 SWS	Lecture (V)	Watzl
WS 19/20	22213	Verfahrenstechnische Grundlagen am Beispiel der Lebensmittelverarbeitung (für LmCh, WiWi)	2 SWS	Lecture (V)	Gaukel
SS 2020	22214	Vertiefung verfahrenstechnischer Grundlagen am Beispiel Lebensmittel	2 SWS	Lecture (V)	Gaukel
Exams					
WS 19/20	7220008	Principles of Food Process Engineering		Prüfung (PR)	Gaukel

Prerequisites
none

T 7.314 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	6241703	Verfahrenstechnik	2 SWS	Lecture (V)	Schneider, Schlick
Exams					
WS 19/20	8240101844	Process Engineering		Prüfung (PR)	Schneider

Prerequisites
None

Recommendation
None

Annotation
None

T 7.315 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2511204	Process Mining	2 SWS	Lecture (V)	Oberweis
SS 2020	2511205	Exercise Process Mining	1 SWS	Practice (Ü)	Oberweis, Schreiber
Exams					
WS 19/20	7900033	Process Mining		Prüfung (PR)	Oberweis
SS 2020	7900048	Process Mining (Registration until 13 July 2020)		Prüfung (PR)	Oberweis

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
2511204, SS 2020, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

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 7.316 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	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	2571154	Product and Innovation Management	2 SWS	Lecture (V)	Feurer

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Below you will find excerpts from events related to this course:

V Product and Innovation Management

2571154, SS 2020, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

Students

- know the most important terms of the product and innovation concept

- understand the models of product choice behavior (e.g., the Markov model, the Luce model)

- are familiar with the basics of network theory (e.g. the Triadic Closure concept)

- know the central strategic concepts of innovation management (especially the market driving approach, pioneer and successor, Miles/Snow typology, blockbuster strategy)

- master the most important methods and sources of idea generation (e.g. open innovation, lead user method, crowdsourcing, creativity techniques, voice of the customer, innovation games, conjoint analysis, quality function deployment, online toolkits)

- are capable of defining and evaluating new product concepts and know the associated instruments like focus groups, product testing, speculative sales, test market simulation Assessor, electronic micro test market

- have advanced knowledge about market introduction (e.g. adoption and diffusion models Bass, Fourt/Woodlock, Mansfield)

- understand important connections of the innovation process (cluster formation, innovation culture, teams, stage-gate process)

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Total effort for 3 credit points: approx. 90 hours

Presence time: 30 hours

Preparation and wrap-up of LV: 45.0 hours

Exam and exam preparation: 15.0 hours

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Literature

Homburg, Christian (2016), Marketingmanagement, 6. Aufl., Wiesbaden.

T 7.317 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-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture (V)	Steegmüller, Kienzle
Exams					
WS 19/20	76-T-MACH-110318	Product- and Production-Concepts for modern Automobiles		Prüfung (PR)	Steegmüller, Kienzle

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.318 Course: Production and Logistics Management [T-WIWI-102632]

Responsible: Dr.-Ing. Simon Glöser-Chahoud
Prof. Dr. Frank Schultmann

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101412 - Industrial Production III

Type	Credits	Recurrence	Version
Written examination	5,5	Each summer term	1

Events					
SS 2020	2581954	Production and Logistics Management	2 SWS	Lecture (V)	Schultmann, Glöser-Chahoud
SS 2020	2581955	Übung zu Produktions- und Logistikmanagement	2 SWS	Practice (Ü)	Zimmer, Huster
Exams					
WS 19/20	7981954	Production and Logistics Management		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of a written exam (90 minutes) (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Production and Logistics Management

2581954, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.319 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	Recurrence	Version
Examination of another type	4,5	Each winter term	2

Events					
WS 19/20	2512501	Project lab Cognitive automobiles and robots	3 SWS	Practical course (P)	Zöllner
SS 2020	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar (S)	Zöllner
Exams					
WS 19/20	7900107	Advanced Lab Cognitive Automobile and Robots		Prüfung (PR)	Zöllner
SS 2020	7900147	Cognitive Automobiles and Robots		Prüfung (PR)	Zöllner

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 Cognitive automobiles and robots

2512501, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

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 4.5 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.

V

Cognitive Automobiles and Robots

2513500, SS 2020, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

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.

T 7.320 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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2512500	Project Lab Machine Learning	3 SWS	Practical course (P)	Zöllner
Exams					
SS 2020	7900086	Project Lab Machine Learning		Prüfung (PR)	Zöllner

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 2020, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

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 4.5 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.

T 7.321 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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581963	Project Management	2 SWS	Lecture (V)	Schultmann, Volk, Wiens, Schumacher, Rosenberg, Wehrle
WS 19/20	2581964	Übung zu Project Management	1 SWS	Practice (Ü)	Volk, Wiens, Schumacher, Rosenberg, Wehrle
Exams					
WS 19/20	7981963	Project Management		Prüfung (PR)	Schultmann

Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Project Management

2581963, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

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 7.322 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	6241701	Projektmanagement in der Bau- und Immobilienwirtschaft	4 SWS	Lecture / Practice (VÜ)	Haghsheno, Hirschberger, Sittinger, Münzl
Exams					
WS 19/20	8240103432	Project Management in Construction and Real Estate Industry I		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.323 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	6241701	Projektmanagement in der Bau- und Immobilienwirtschaft	4 SWS	Lecture / Practice (VÜ)	Haghsheno, Hirschberger, Sittinger, Münzl
Exams					
WS 19/20	8240103433	Project Management in Construction and Real Estate Industry II		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.324 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	Recurrence	Version
Examination of another type	1,5	Each winter term	1

Events					
WS 19/20	6241901	Lean Construction	4 SWS	Lecture / Practice (VÜ)	Haghsheno, Mitarbeiter/innen
Exams					
WS 19/20	8246101007	Project paper Lean Construction		Prüfung (PR)	Haghsheno

Competence Certificate
project:
report, appr. 10 pages, and
presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.325 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6243801	Projektstudien	2 SWS	Lecture / Practice (VÜ)	Haupenthal, Gentes
Exams					
WS 19/20	8240101847	Project Studies		Prüfung (PR)	Gentes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.326 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	Recurrence	Version
Oral examination	4,5	Each term	1

Events					
WS 19/20	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture (V)	Gauterin, Gießler, Frey
SS 2020	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture (V)	Gauterin, Gießler, Frey
Exams					
WS 19/20	76-T-MACH-102156	Project Workshop: Automotive Engineering		Prüfung (PR)	Gauterin

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 19/20, 3 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 2020, 3 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 7.327 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561127	Public Management	3 SWS	Lecture / Practice (VÜ)	Wigger

Competence Certificate
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

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 19/20, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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 7.328 Course: Public Media Law [T-INFO-101311]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	24082	Public Media Law	2 SWS	Lecture (V)	Kirchberg
Exams					
WS 19/20	7500062	Public Media Law		Prüfung (PR)	Dreier, Matz
SS 2020	7500058	Public Media Law		Prüfung (PR)	Dreier, Matz

T 7.329 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2560120	Public Revenues	2 SWS	Lecture (V)	Wigger
SS 2020	2560121	Übung zu Öffentliche Einnahmen	1 SWS	Practice (Ü)	Wigger

Competence Certificate
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.330 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	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2020	2114862	Python Algorithms for Automotive Engineering	2 SWS	Lecture (V)	Rhode

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 2020, 2 SWS, Language: German, Open in study portal **Lecture (V)**

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.

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 7.331 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2500016	Python for Computational Risk and Asset Management	2 SWS	Practical course (P)	Ulrich
Exams					
WS 19/20	7900220	Python for Computational Risk and Asset Management		Prüfung (PR)	Ulrich

Competence Certificate
The assessment is carried out in form of twelve weekly Python programming tasks and offered each winter term. The grade of this course is determined by the points achieved in the programming tasks.

Prerequisites
None.

Recommendation
Good knowledge of statistics and first programming experience with Python is recommended.

Below you will find excerpts from events related to this course:

V Python for Computational Risk and Asset Management

2500016, WS 19/20, 2 SWS, Language: English, Open in study portal — **Practical course (P)**

Content
The aim of this course is to provide students with strong knowledge in Python to independently solve real-world data problems related to automated robo investment advisory.

The course covers several topics from a programming perspective, among them:

Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization

Return Densities: Forecasting with Traditional and Machine Learning Approaches, Monte Carlo Simulation

Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor

Multi-Asset Valuation: DCF Approach, No-Arbitrage and Ito Calculus

The total workload for this course is approximately 90 hours.

Prior knowledge of AIFB programming and KIT statistics classes is recommended.

The course introduces students to Python. Students will solve problems related to the agenda of the lecture 'Computational Risk and Asset Management'. This enables them to work with financial data, perform various statistical analysis and estimate their own time series models.

T 7.332 Course: Quality Management [T-MACH-102107]

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

Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-101284 - Specialization in Production Engineering

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2149667	Quality Management	2 SWS	Lecture (V)	Lanza
Exams					
WS 19/20	76-T-MACH-102107	Quality Management		Prüfung (PR)	Lanza

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events related to this course:

V Quality Management

2149667, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.333 Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

Responsible: Dr. Dogan Keles
Patrick Plötz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101451 - Energy Economics and Energy Markets

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581007	Quantitative Methods in Energy Economics	2 SWS	Lecture (V)	Plötz, Keles
WS 19/20	2581008	Übung zu Quantitative Methods in Energy Economics	1 SWS	Practice (Ü)	Plötz
Exams					
WS 19/20	7981007	Quantitative Methods in Energy Economics		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (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
None

Below you will find excerpts from events related to this course:

V Quantitative Methods in Energy Economics

2581007, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

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 7.334 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	Recurrence	Version
Oral examination	3	Each summer term	1

Prerequisites
none

T 7.335 Course: Rail System Technology [T-MACH-102143]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101274 - Rail System Technology

Type	Credits	Recurrence	Version
Oral examination	9	Each term	3

Events					
WS 19/20	2115919	Rail System Technology	2 SWS	Lecture (V)	Gratzfeld
WS 19/20	2115996	Rail Vehicle Technology	2 SWS	Lecture (V)	Gratzfeld
SS 2020	2115919	Rail System Technology	2 SWS	Lecture (V)	Gratzfeld
SS 2020	2115996	Rail Vehicle Technology	2 SWS	Lecture (V)	Gratzfeld
Exams					
WS 19/20	76-T-MACH-102143	Rail System Technology		Prüfung (PR)	Gratzfeld
SS 2020	76-T-MACH-102143	Rail System Technology		Prüfung (PR)	Gratzfeld

Competence Certificate
Oral examination

Duration: ca. 45 minutes

No tools or reference materials may be used during the exam.

Prerequisites
none

Below you will find excerpts from events related to this course:

V Rail System Technology

2115919, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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, power networks, filling stations
8. History (optional)

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, interfaces
3. Bogies: forces, running gears, axle configuration
4. Drives: vehicle with/without contact wire, dual-mode vehicle
5. Brakes: tasks, basics, principles, blending, brake control
6. Train control management system: definitions, networks, bus systems, components, examples
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck coaches, 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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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, power networks, filling stations
8. History (optional)

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content

1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, interfaces
3. Bogies: forces, running gears, axle configuration
4. Drives: vehicle with/without contact wire, dual-mode vehicle
5. Brakes: tasks, basics, principles, blending, brake control
6. Train control management system: definitions, networks, bus systems, components, examples
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck coaches, 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).

T 7.336 Course: Real World Lab: Innovation Communication [T-WIWI-110920]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105312 - Marketing and Sales Management

Type	Credits	Recurrence	Version
Examination of another type	1,5	Once	1

Competence Certificate
Alternative exam assessment (two team presentations).

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 7.337 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-101470 - Data Science: Advanced CRM

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2540506	Recommender Systems	2 SWS	Lecture (V)	Geyer-Schulz
SS 2020	2540507	Exercise Recommender Systems	1 SWS	Practice (Ü)	Nazemi

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

2540506, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

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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.

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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.

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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 7.338 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	Recurrence	Version
Oral examination	4,5	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 7.339 Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

Responsible: Prof. Dr. Frank Schultmann
Dr. Marcus Wiens
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type	Credits	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581992	Risk Management in Industrial Supply Networks	2 SWS	Lecture (V)	Wiens
WS 19/20	2581993	Übung zu Risk Management in Industrial Supply Networks	1 SWS	Practice (Ü)	Klein, Wiens
Exams					
WS 19/20	7981992	Risk Management in Industrial Supply Networks		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Risk Management in Industrial Supply Networks

2581992, WS 19/20, 2 SWS, Language: English, Open in study portal **Lecture (V)**

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 7.340 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2020	2545102	Technology Assessment	2 SWS	Seminar (S)	Koch

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.

Below you will find excerpts from events related to this course:

V Technology Assessment

2545102, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
Technology Assessment can play a role at different points in the innovation process and can be considered as decision support for or against certain technological options. The seminar Technology Assessment will focus on the early phase "fuzzy front end" in innovation management. The technology assessment will take place here under a high degree of uncertainty regarding future technological developments. The evaluation of technologies can be done with methods such as Technology Readiness, Technology Lifecycle Analysis, Portfolio Analysis, etc.. The early evaluation of technologies is particularly important against the background of limited resources in companies and uncertainty about future developments.

T 7.341 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	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2117061	Safety Engineering	2 SWS	Lecture (V)	Kany
Exams					
WS 19/20	7600004	Safety Engineering		Prüfung (PR)	Kany

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 19/20, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

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

Note
Dates: See IFL-Homepage

Literature
Defren/Wickert: Sicherheit für den Maschinen- und Anlagenbau, Druckerei und
Verlag: H. von Ameln, Ratingen

T 7.342 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	6233906	Sicherheitsmanagement im Straßenwesen	2 SWS	Lecture / Practice (VÜ)	Zimmermann

Competence Certificate
oral exam with 15 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.343 Course: Selected Applications of Technical Logistics [T-MACH-102160]

Responsible: Viktor Milushev
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2118087	Selected Applications of Technical Logistics	3 SWS	Lecture (V)	Mittwollen, Milushev
Exams					
WS 19/20	76-T-MACH-102160	Selected Applications of Technical Logistics		Prüfung (PR)	Mittwollen

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
Knowledge out of Basics of Technical Logistics I (T-MACH-109919) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned.

Below you will find excerpts from events related to this course:

V Selected Applications of Technical Logistics

2118087, SS 2020, 3 SWS, Language: German, Open in study portal

Lecture (V)

Content

- design and dimension of machines from intralogistics
- static and dynamic behaviour
- operation properties and specifics
- Inside practical lectures: sample applications and calculations in addition to the lectures

Details according schedule will be published

Literature
Empfehlungen in der Vorlesung

T 7.344 Course: Selected Applications of Technical Logistics - Project [T-MACH-108945]

Responsible: Viktor Milushev
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104888 - Advanced Module Logistics

Type	Credits	Recurrence	Version
Examination of another type	2	Each summer term	1

Events					
SS 2020	2118088	Selected Applications of Technical Logistics - Project	1 SWS	Project (PRO)	Milushev, Mittwollen
Exams					
WS 19/20	76-T-MACH-108945	Selected Applications of Technical Logistics - Project		Prüfung (PR)	Mittwollen

Competence Certificate
presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation

Prerequisites
T-MACH-102160 (selected applications of technical logistics) must have been started

Recommendation
Knowledge out of Basics of Technical Logistics I (T-MACH-109919) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned.

Below you will find excerpts from events related to this course:

V Selected Applications of Technical Logistics - Project

2118088, SS 2020, 1 SWS, Language: German, Open in study portal

Project (PRO)

Literature
Empfehlungen in der Vorlesung

T 7.345 Course: Selected Issues in Critical Information Infrastructures [T-WIWI-109251]

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	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2512403	Praktikum Blockchain und Distributed Ledger Technology (Master)	SWS	Practical course (P)	Sunyaev, Beyene, Kannengießer, Pandl
Exams					
SS 2020	7900172	Lab Blockchain and Distributed Ledger Technology (Master)		Prüfung (PR)	Sunyaev

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO). Details will be announced in the respective course.

Prerequisites
None.

Annotation
T-WIWI-109251 "Selected Issues in Critical Information Infrastructures" serves to credit an extracurricular course in the module "Critical Digital Infrastructures".

T 7.346 Course: Selected Legal Isues of Internet Law [T-INFO-108462]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law

Type	Credits	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2020	24821	Selected legal issues of Internet law	2 SWS	Colloquium (KOL)	Dreier
Exams					
SS 2020	7500226	Selected legal issues of Internet law		Prüfung (PR)	Dreier

T 7.347 Course: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

Responsible: Mathias Heckele
Dr.-Ing. Timo Mappes

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS
M-MACH-101292 - Microoptics

Type	Credits	Recurrence	Version
Oral examination	3	Each term	1

Competence Certificate
Oral examination

Prerequisites
none

T 7.348 Course: Semantic Web Technologies [T-WIWI-110848]

Responsible: Prof. Dr. York Sure-Vetter
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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2511310	Semantic Web Technologies	2 SWS	Lecture (V)	Sure-Vetter, Acosta Deibe, Käfer
SS 2020	2511311	Exercises to Semantic Web Technologies	1 SWS	Practice (Ü)	Sure-Vetter, Acosta Deibe, Käfer
Exams					
SS 2020	7900028	Semantic Web Technologies (Registration until 13 July 2020)		Prüfung (PR)	Sure-Vetter

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

2511310, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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)**
2511311, SS 2020, 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.

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 7.349 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2151643	Seminar Data Mining in Production	2 SWS	Seminar (S)	Lanza
SS 2020	2151643	Seminar Data Mining in Production	2 SWS	Seminar (S)	Lanza
Exams					
WS 19/20	76-T-MACH-108737	Seminar Data-Mining in Production		Prüfung (PR)	Lanza

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

2151643, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

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

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

V

Seminar Data Mining in Production

2151643, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

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

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

T 7.350 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2500029	Seminar in Data Science for Finance	2 SWS	Seminar (S)	Ulrich
WS 19/20	2530293		2 SWS	Seminar (S)	Ruckes, Hoang, Benz, Strych, Luedecke, Silbereis, Stengel, Schubert
WS 19/20	2540473	Data Science in Service Management	2 SWS	Seminar (S)	Haubner, Frankenhauser, Gröschel
WS 19/20	2540475	Electronic Markets & User behavior	2 SWS	Seminar (S)	Dorner, Knierim, Dann, Jaquart
WS 19/20	2540477	Digital Experience and Participation	2 SWS	Seminar (S)	Straub, Peukert, Hoffmann, Kloker, Pusmaz, Willrich, Kloepper, Fegert, Greif-Winzrieth
WS 19/20	2540478	Smart Grids and Energy Markets	2 SWS	Seminar (S)	Dinther, Staudt, Richter, Huber, vom Scheidt, Golla, Schmidt
WS 19/20	2540510	Masterseminar in Data Science and Machine Learning	2 SWS	Seminar (S)	Geyer-Schulz, Schweigert, Schweizer, Nazemi
WS 19/20	2540557	Literature Review Seminar: Information Systems and Service Design	3 SWS	Seminar (S)	Mädche
WS 19/20	2540559	Digital Service Design Seminar	2 SWS	Seminar (S)	Mädche
WS 19/20	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar (S)	Koch
WS 19/20	2572181		2 SWS	Seminar (S)	Klarmann
WS 19/20	2577915	Strategische Unternehmensführung	2 SWS	Seminar (S)	Klopfer
WS 19/20	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar (S)	Riar
WS 19/20	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar (S)	Glöser-Chahoud, Schultmann
WS 19/20	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar (S)	Volk, Schultmann
WS 19/20	2581978	Seminar in Production and Operations Management III	2 SWS	Seminar (S)	Wiens, Schultmann
WS 19/20	2581980		2 SWS	Seminar (S)	Keles, Fett, Yilmaz
WS 19/20	2581981		2 SWS	Seminar (S)	Ardone, Ruppert, Sandmeier, Slednev

WS 19/20	2581990		2 SWS	Seminar (S)	Schultmann, Schumacher
SS 2020	2400121	Interactive Analytics Seminar	2 SWS		Beigl, Mädche, Pescara
SS 2020	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2020	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2020	2530372	Advances in Financial Machine Learning	2 SWS	Seminar (S)	Ulrich
SS 2020	2530580	Seminar in Finance	2 SWS	Seminar (S)	Uhrig-Homburg, Eska, Schuster, Eberbach, Reichenbacher
SS 2020	2540510	Masterseminar in Data Science and Machine Learning	2 SWS	Seminar (S)	Geyer-Schulz
SS 2020	2540559	Digital Service Design Seminar	3 SWS	Seminar (S)	Mädche, Feine
SS 2020	2545002	Entrepreneurship Research	2 SWS	Seminar (S)	Terzidis, Henn
SS 2020	2550493	Hospital Management	2 SWS	Block (B)	Hansis
SS 2020	2571180	Seminar in Marketing und Vertrieb (Bachelor)	2 SWS	Seminar (S)	Klarmann, Mitarbeiter, Feurer
SS 2020	2571181	Seminar in Marketing und Vertrieb (Master)	2 SWS	Seminar (S)	Klarmann, Mitarbeiter, Feurer
SS 2020	2579909	Seminar Management Accounting	2 SWS	Seminar (S)	Wouters, Hammann, Disch
SS 2020	2579919	Seminar in Management Accounting - Special Topics	2 SWS	Seminar (S)	Wouters, Ebinger
SS 2020	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar (S)	Volk, Schultmann
SS 2020	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar (S)	Keles
SS 2020	2581990		2 SWS	Seminar (S)	Schultmann, Schumacher, Baumgartner
Exams					
WS 19/20	7900017	Seminar Smart Grid and Energy Markets		Prüfung (PR)	Weinhardt
WS 19/20	7900106	Hospital Management		Prüfung (PR)	Nickel
WS 19/20	7900133	Digital Service Design Seminar		Prüfung (PR)	Mädche
WS 19/20	7900141	Innovation Processes Live		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900143	Methods in Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900151	Master Seminar in Data Science and Machine Learning		Prüfung (PR)	Geyer-Schulz
WS 19/20	7900159	Seminar in Marketing and Sales		Prüfung (PR)	Klarmann
WS 19/20	7900163	Seminar Human Resource Management (Master)		Prüfung (PR)	Nieken
WS 19/20	7900164	Seminar Human Resources and Organizations (Master)		Prüfung (PR)	Nieken
WS 19/20	7900165	Seminar Digital Experience and Participation		Prüfung (PR)	Weinhardt
WS 19/20	7900184	Seminar in Finance (Master)		Prüfung (PR)	Ruckes
WS 19/20	7900203	Seminar in Finance		Prüfung (PR)	Uhrig-Homburg
WS 19/20	7900222	Seminar Strategic Management (Master)		Prüfung (PR)	Lindstädt
WS 19/20	7900233	Literature Review Seminar: Information Systems and Service Design (Seminar)		Prüfung (PR)	Mädche
WS 19/20	7900237	Case Studies Seminar: Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900239	Technologies for Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900312	Seminar Business Data Analytics (Master)		Prüfung (PR)	Weinhardt
WS 19/20	7900324	Seminar in Business Administration A (Master)		Prüfung (PR)	Ulrich

WS 19/20	7900327	Electronic Markets & User behavior (Seminar)	Prüfung (PR)	Weinhardt
WS 19/20	79-2579919-M	Seminar Management Accounting - Special Topics (Master)	Prüfung (PR)	Wouters
WS 19/20	7981976	Seminar in Production and Operations Management I	Prüfung (PR)	Schultmann
WS 19/20	7981977	Seminar in Production and Operations Management II	Prüfung (PR)	Schultmann
WS 19/20	7981978	Seminar in Production and Operations Management III	Prüfung (PR)	Schultmann
WS 19/20	7981979	Seminar in Business Administration A (Master)	Prüfung (PR)	Fichtner
WS 19/20	7981980	Seminar in Business Administration A (Master)	Prüfung (PR)	Fichtner
WS 19/20	7981981	Seminar in Business Administration (Bachelor)	Prüfung (PR)	Fichtner
SS 2020	7900017	Die Aushandlung von Open Innovation	Prüfung (PR)	Weissenberger-Eibl
SS 2020	7900052	Entrepreneurship Research	Prüfung (PR)	Terzidis
SS 2020	7900093	Seminar in Business Administration A	Prüfung (PR)	Weinhardt
SS 2020	7900219	Seminar in Business Administration A (Master)	Prüfung (PR)	Ulrich
SS 2020	7900238	Technology Assessment	Prüfung (PR)	Weissenberger-Eibl
SS 2020	7900242	Applied Risk and Asset Management	Prüfung (PR)	Ulrich
SS 2020	7900284	Digital Transformation and Business Models	Prüfung (PR)	Weissenberger-Eibl
SS 2020	7981976	Seminar in Production and Operations Management I	Prüfung (PR)	Schultmann
SS 2020	7981977	Seminar in Production and Operations Management II	Prüfung (PR)	Schultmann
SS 2020	7981978	Seminar in Production and Operations Management III	Prüfung (PR)	Schultmann
SS 2020	7981980	Seminar Energy Economics II	Prüfung (PR)	Fichtner
SS 2020	7981981	Seminar Energy Economics III	Prüfung (PR)	Fichtner

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 Human Resource Management (Master)** **Seminar (S)**
2500006, WS 19/20, 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.

V

Seminar Human Resources and Organizations (Master)

2500007, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

V

Seminar in Data Science for Finance

2500029, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The aim of this seminar is to master real-world challenges of computational risk and asset management. The CRAM team offers a wide range of topics across different asset classes and different stages of the investment process.

Students will work on a quantitative problem related to risk and asset management. This seminar is ideally suited for students who want to deepen and apply their statistics / programming skills and knowledge about financial markets. Industry-relevant problems will be solved with financial data and modern statistical tools in close collaboration with a supervisor. Topics which students solved in the past include the option-based pricing of dividends during the Euro crisis, the estimation of risk neutral moments with high-frequent data and the application of a particle filter to estimate stochastic volatility. The current topics will be presented during the first meeting.

V **Data Science in Service Management** **Seminar (S)**
2540473, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Content
wird auf deutsch und englisch gehalten

V **Masterseminar in Data Science and Machine Learning** **Seminar (S)**
2540510, WS 19/20, 2 SWS, Language: German, Open in study portal

V **Digital Service Design Seminar** **Seminar (S)**
2540559, WS 19/20, 2 SWS, Open in study portal

V **Methoden im Innovationsmanagement** **Seminar (S)**
2545107, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

V **Seminar (S)**
2572181, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Students

- can exploit a literature field systematically
- are able to write an academic paper in a formally correct way
- can assess the relevance and quality of sources
- are able to get an overview of sources very quickly
- know how to find relevant sources for a literature field
- are capable to write a convincing outline
- know how to categorize a subject under a research field
- understand how to systematize literature fields theoretically and empirically with the help of literature tables
- can identify the most important findings in a huge number of sources
- are able to present a research field
- can discuss the theoretical and practical implications of a topic
- are capable to identify interesting research gaps

The total workload for this course is approximately 90 hours. For further information see German version.

Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)

Literature
werden im Seminar bekannt gegeben./will be anounced in the seminary.

V Seminar Management Accounting - Special Topics

2579919, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

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 16 students.

Literature
Will be announced in the course.

V Interactive Analytics Seminar

2400121, SS 2020, 2 SWS, Language: English, Open in study portal

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.

V Seminar Human Resource Management (Master)

2500006, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

V

Seminar Human Resources and Organizations (Master)

2500007, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

V

Advances in Financial Machine Learning

2530372, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

V Seminar in Finance
2530580, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Literature
Wird jeweils am Ende des vorherigen Semesters bekanntgegeben.

V Masterseminar in Data Science and Machine Learning
2540510, SS 2020, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

V Digital Service Design Seminar
2540559, SS 2020, 3 SWS, Language: English, Open in study portal

Seminar (S)

Content
Description

In this seminar, a team of students addresses a real-world design challenge of an IISM cooperation partner. Students learn and apply design methods, techniques, and tools to explore the problem and deliver a solution in the form of an innovative prototype

Learning objectives

The students

- explore a real-world digital service design challenge
- understand the human-centered design process and apply selected design techniques & tools
- deliver a digital service prototype as a potential solution for the challenge

Prerequisites

No specific prerequisites are required for the seminar

Literature

Further literature will be made available in the seminar.

V Entrepreneurship Research
2545002, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Literature
Wird im Seminar bekannt gegeben.

V Hospital Management
2550493, SS 2020, 2 SWS, Language: German, Open in study portal

Block (B)

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.

V Seminar Management Accounting
2579909, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

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.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Note:

- Maximum of 16 students.

Literature
Will be announced in the course.

V

Seminar in Management Accounting - Special Topics

2579919, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

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.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Note:

- Maximum of 16 students.

Literature
Will be announced in the course.

T 7.351 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2500029	Seminar in Data Science for Finance	2 SWS	Seminar (S)	Ulrich
WS 19/20	2530293		2 SWS	Seminar (S)	Ruckes, Hoang, Benz, Strych, Luedecke, Silbereis, Stengel, Schubert
WS 19/20	2540473	Data Science in Service Management	2 SWS	Seminar (S)	Haubner, Frankenhauser, Gröschel
WS 19/20	2540475	Electronic Markets & User behavior	2 SWS	Seminar (S)	Dorner, Knierim, Dann, Jaquart
WS 19/20	2540477	Digital Experience and Participation	2 SWS	Seminar (S)	Straub, Peukert, Hoffmann, Kloker, Pusmaz, Willrich, Kloepper, Fegert, Greif-Winzrieth
WS 19/20	2540478	Smart Grids and Energy Markets	2 SWS	Seminar (S)	Dinther, Staudt, Richter, Huber, vom Scheidt, Golla, Schmidt
WS 19/20	2540510	Masterseminar in Data Science and Machine Learning	2 SWS	Seminar (S)	Geyer-Schulz, Schweigert, Schweizer, Nazemi
WS 19/20	2540557	Literature Review Seminar: Information Systems and Service Design	3 SWS	Seminar (S)	Mädche
WS 19/20	2540559	Digital Service Design Seminar	2 SWS	Seminar (S)	Mädche
WS 19/20	2545107	Methoden im Innovationsmanagement	2 SWS	Seminar (S)	Koch
WS 19/20	2572181		2 SWS	Seminar (S)	Klarmann
WS 19/20	2577915	Strategische Unternehmensführung	2 SWS	Seminar (S)	Klopfer
WS 19/20	2579919	Seminar Management Accounting - Special Topics	2 SWS	Seminar (S)	Riar
WS 19/20	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar (S)	Glöser-Chahoud, Schultmann
WS 19/20	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar (S)	Volk, Schultmann
WS 19/20	2581978	Seminar in Production and Operations Management III	2 SWS	Seminar (S)	Wiens, Schultmann
WS 19/20	2581980		2 SWS	Seminar (S)	Keles, Fett, Yilmaz
WS 19/20	2581981		2 SWS	Seminar (S)	Ardone, Ruppert, Sandmeier, Slednev

WS 19/20	2581990		2 SWS	Seminar (S)	Schultmann, Schumacher
SS 2020	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2020	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2020	2530372	Advances in Financial Machine Learning	2 SWS	Seminar (S)	Ulrich
SS 2020	2530580	Seminar in Finance	2 SWS	Seminar (S)	Uhrig-Homburg, Eska, Schuster, Eberbach, Reichenbacher
SS 2020	2540510	Masterseminar in Data Science and Machine Learning	2 SWS	Seminar (S)	Geyer-Schulz
SS 2020	2540559	Digital Service Design Seminar	3 SWS	Seminar (S)	Mädche, Feine
SS 2020	2545002	Entrepreneurship Research	2 SWS	Seminar (S)	Terzidis, Henn
SS 2020	2550493	Hospital Management	2 SWS	Block (B)	Hansis
SS 2020	2571180	Seminar in Marketing und Vertrieb (Bachelor)	2 SWS	Seminar (S)	Klarmann, Mitarbeiter, Feurer
SS 2020	2571181	Seminar in Marketing und Vertrieb (Master)	2 SWS	Seminar (S)	Klarmann, Mitarbeiter, Feurer
SS 2020	2579909	Seminar Management Accounting	2 SWS	Seminar (S)	Wouters, Hammann, Disch
SS 2020	2579919	Seminar in Management Accounting - Special Topics	2 SWS	Seminar (S)	Wouters, Ebinger
SS 2020	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar (S)	Volk, Schultmann
SS 2020	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar (S)	Keles
SS 2020	2581990		2 SWS	Seminar (S)	Schultmann, Schumacher, Baumgartner
Exams					
WS 19/20	7900017	Seminar Smart Grid and Energy Markets		Prüfung (PR)	Weinhardt
WS 19/20	7900106	Hospital Management		Prüfung (PR)	Nickel
WS 19/20	7900133	Digital Service Design Seminar		Prüfung (PR)	Mädche
WS 19/20	7900141	Innovation Processes Live		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900143	Methods in Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900151	Master Seminar in Data Science and Machine Learning		Prüfung (PR)	Geyer-Schulz
WS 19/20	7900159	Seminar in Marketing and Sales		Prüfung (PR)	Klarmann
WS 19/20	7900163	Seminar Human Resource Management (Master)		Prüfung (PR)	Nieken
WS 19/20	7900164	Seminar Human Resources and Organizations (Master)		Prüfung (PR)	Nieken
WS 19/20	7900165	Seminar Digital Experience and Participation		Prüfung (PR)	Weinhardt
WS 19/20	7900184	Seminar in Finance (Master)		Prüfung (PR)	Ruckes
WS 19/20	7900203	Seminar in Finance		Prüfung (PR)	Uhrig-Homburg
WS 19/20	7900222	Seminar Strategic Management (Master)		Prüfung (PR)	Lindstädt
WS 19/20	7900233	Literature Review Seminar: Information Systems and Service Design (Seminar)		Prüfung (PR)	Mädche
WS 19/20	7900237	Case Studies Seminar: Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900239	Technologies for Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 19/20	7900312	Seminar Business Data Analytics (Master)		Prüfung (PR)	Weinhardt
WS 19/20	7900324	Seminar in Business Administration A (Master)		Prüfung (PR)	Ulrich
WS 19/20	7900327	Electronic Markets & User behavior (Seminar)		Prüfung (PR)	Weinhardt

WS 19/20	79-2579919-M	Seminar Management Accounting - Special Topics (Master)	Prüfung (PR)	Wouters
WS 19/20	7981976	Seminar in Production and Operations Management I	Prüfung (PR)	Schultmann
WS 19/20	7981977	Seminar in Production and Operations Management II	Prüfung (PR)	Schultmann
WS 19/20	7981978	Seminar in Production and Operations Management III	Prüfung (PR)	Schultmann
WS 19/20	7981979	Seminar in Business Administration A (Master)	Prüfung (PR)	Fichtner
WS 19/20	7981980	Seminar in Business Administration A (Master)	Prüfung (PR)	Fichtner
WS 19/20	7981981	Seminar in Business Administration (Bachelor)	Prüfung (PR)	Fichtner
SS 2020	7900017	Die Aushandlung von Open Innovation	Prüfung (PR)	Weissenberger-Eibl
SS 2020	7900052	Entrepreneurship Research	Prüfung (PR)	Terzidis
SS 2020	7900093	Seminar in Business Administration A	Prüfung (PR)	Weinhardt
SS 2020	7900238	Technology Assessment	Prüfung (PR)	Weissenberger-Eibl
SS 2020	7900242	Applied Risk and Asset Management	Prüfung (PR)	Ulrich
SS 2020	7900284	Digital Transformation and Business Models	Prüfung (PR)	Weissenberger-Eibl
SS 2020	7981976	Seminar in Production and Operations Management I	Prüfung (PR)	Schultmann
SS 2020	7981977	Seminar in Production and Operations Management II	Prüfung (PR)	Schultmann
SS 2020	7981978	Seminar in Production and Operations Management III	Prüfung (PR)	Schultmann
SS 2020	7981980	Seminar Energy Economics II	Prüfung (PR)	Fichtner
SS 2020	7981981	Seminar Energy Economics III	Prüfung (PR)	Fichtner

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 Human Resource Management (Master)** **Seminar (S)**
2500006, WS 19/20, 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.

V Seminar Human Resources and Organizations (Master)

2500007, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

V Seminar in Data Science for Finance

2500029, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The aim of this seminar is to master real-world challenges of computational risk and asset management. The CRAM team offers a wide range of topics across different asset classes and different stages of the investment process.

Students will work on a quantitative problem related to risk and asset management. This seminar is ideally suited for students who want to deepen and apply their statistics / programming skills and knowledge about financial markets. Industry-relevant problems will be solved with financial data and modern statistical tools in close collaboration with a supervisor. Topics which students solved in the past include the option-based pricing of dividends during the Euro crisis, the estimation of risk neutral moments with high-frequent data and the application of a particle filter to estimate stochastic volatility. The current topics will be presented during the first meeting.

V **Data Science in Service Management** **Seminar (S)**
2540473, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Content
wird auf deutsch und englisch gehalten

V **Masterseminar in Data Science and Machine Learning** **Seminar (S)**
2540510, WS 19/20, 2 SWS, Language: German, Open in study portal

V **Digital Service Design Seminar** **Seminar (S)**
2540559, WS 19/20, 2 SWS, Open in study portal

V **Methoden im Innovationsmanagement** **Seminar (S)**
2545107, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

V **Seminar (S)**
2572181, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Students

- can exploit a literature field systematically
- are able to write an academic paper in a formally correct way
- can assess the relevance and quality of sources
- are able to get an overview of sources very quickly
- know how to find relevant sources for a literature field
- are capable to write a convincing outline
- know how to categorize a subject under a research field
- understand how to systematize literature fields theoretically and empirically with the help of literature tables
- can identify the most important findings in a huge number of sources
- are able to present a research field
- can discuss the theoretical and practical implications of a topic
- are capable to identify interesting research gaps

The total workload for this course is approximately 90 hours. For further information see German version.

Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)

Literature
werden im Seminar bekannt gegeben./will be anounced in the seminary.

V Seminar Management Accounting - Special Topics

2579919, WS 19/20, 2 SWS, Language: English, Open in study portal

Seminar (S)

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 16 students.

Literature
Will be announced in the course.

V Seminar Human Resource Management (Master)

2500006, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

V Seminar Human Resources and Organizations (Master)

2500007, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

V Advances in Financial Machine Learning

2530372, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

V Seminar in Finance

2530580, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Literature
Wird jeweils am Ende des vorherigen Semesters bekanntgegeben.

V Masterseminar in Data Science and Machine Learning

2540510, SS 2020, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

V Digital Service Design Seminar

2540559, SS 2020, 3 SWS, Language: English, Open in study portal

Seminar (S)

Content
Description

In this seminar, a team of students addresses a real-world design challenge of an IISM cooperation partner. Students learn and apply design methods, techniques, and tools to explore the problem and deliver a solution in the form of an innovative prototype

Learning objectives

The students

- explore a real-world digital service design challenge
- understand the human-centered design process and apply selected design techniques & tools
- deliver a digital service prototype as a potential solution for the challenge

Prerequisites

No specific prerequisites are required for the seminar

Literature

Further literature will be made available in the seminar.

V Entrepreneurship Research

2545002, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Literature
Wird im Seminar bekannt gegeben.

V Hospital Management

2550493, SS 2020, 2 SWS, Language: German, Open in study portal

Block (B)

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.

V Seminar Management Accounting

2579909, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

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.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Note:

- Maximum of 16 students.

Literature
Will be announced in the course.

V

Seminar in Management Accounting - Special Topics

2579919, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

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.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Note:

- Maximum of 16 students.

Literature
Will be announced in the course.

T 7.352 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	Recurrence	Version
Examination of another type	3	Each term	1

Exams				
WS 19/20	7900103	Data-driven innovation and science communication (Master)	Prüfung (PR)	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 7.353 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2560140	Topics in Political Economy (Bachelor)	2 SWS	Seminar (S)	Ehrlich, Huber
WS 19/20	2560141	Morals & Social Behavior (Bachelor & Master)	2 SWS	Seminar (S)	Huber, Ehrlich
WS 19/20	2560142	Topics in Political Economy (Master)	2 SWS	Seminar (S)	Ehrlich, Huber
WS 19/20	2561208	Ausgewählte Aspekte der europäischen Verkehrsplanung und -modellierung	1 SWS	Seminar (S)	Szimba
SS 2020	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Krüger, Buse, Görgen
SS 2020	2560282	Wirtschaftspolitisches Seminar	2 SWS	Seminar (S)	Ott, Assistenten
SS 2020	2560554	Fighting Climate Change, Seminar on Morals and Social Behavior (Bachelor)	2 SWS	Seminar (S)	Szech, Zhao
SS 2020	2560556	Designing the Digital Economy, Topics on Political Economy (Bachelor)	2 SWS	Seminar (S)	Szech, Huber
SS 2020	2560557	Designing the Digital Economy, Topics on Political Economy (Master)	2 SWS	Seminar (S)	Szech, Huber
Exams					
WS 19/20	7900103	Data-driven innovation and science communication (Master)		Prüfung (PR)	Ott
WS 19/20	7900132	Seminar in Economics A (Master)		Prüfung (PR)	Fuchs-Seliger
WS 19/20	7900139	Seminar in Economics (Bachelor/Master)		Prüfung (PR)	Mitusch
WS 19/20	7900140	Seminar in Economics A (Master)		Prüfung (PR)	Szech, Puppe
WS 19/20	7900186	Seminar Debt, Money and Markets: Economic Narrative and Anthropological Evidence		Prüfung (PR)	Puppe
WS 19/20	7900207	Seminar in Macroeconomics I		Prüfung (PR)	Scheffel
WS 19/20	7900221	Topics in Experimental Economics		Prüfung (PR)	Reiß
WS 19/20	7900259	Seminar in Macroeconomics II		Prüfung (PR)	Scheffel
WS 19/20	7900278	Seminar on Morals and Social Behavior		Prüfung (PR)	Szech, Puppe
WS 19/20	79sefi2	Seminar in Economics A (Master)		Prüfung (PR)	Wigger
SS 2020	7900081	Seminar in Macroeconomics I		Prüfung (PR)	Scheffel

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 Political Economy (Bachelor)** **Seminar (S)**
2560140, WS 19/20, 2 SWS, Language: English, Open in study portal

Content
For Bachelor 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.

For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%). Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

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.

V **Morals & Social Behavior (Bachelor & Master)** **Seminar (S)**
2560141, WS 19/20, 2 SWS, Language: English, Open in study portal

Content
For Bachelor 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.

For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%).

For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally Master students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade.

Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

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.

V **Topics in Political Economy (Master)** **Seminar (S)**
2560142, WS 19/20, 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 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.

For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade. Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

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.

V **Advanced Topics in Econometrics** **Seminar (S)**
2521310, SS 2020, 2 SWS, Language: English, Open in study portal

V **Fighting Climate Change, Seminar on Morals and Social Behavior (Bachelor)** **Seminar (S)**
2560554, SS 2020, 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 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 is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

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 (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). 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.

V **Designing the Digital Economy, Topics on Political Economy (Bachelor)** **Seminar (S)**
2560556, SS 2020, 2 SWS, Language: English, Open in study portal

V **Designing the Digital Economy, Topics on Political Economy (Master)** **Seminar (S)**
2560557, SS 2020, 2 SWS, Language: English, Open in study portal

T 7.354 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2560140	Topics in Political Economy (Bachelor)	2 SWS	Seminar (S)	Ehrlich, Huber
WS 19/20	2560141	Morals & Social Behavior (Bachelor & Master)	2 SWS	Seminar (S)	Huber, Ehrlich
WS 19/20	2560142	Topics in Political Economy (Master)	2 SWS	Seminar (S)	Ehrlich, Huber
WS 19/20	2561208	Ausgewählte Aspekte der europäischen Verkehrsplanung und -modellierung	1 SWS	Seminar (S)	Szimba
SS 2020	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Krüger, Buse, Görgen
SS 2020	2560282	Wirtschaftspolitisches Seminar	2 SWS	Seminar (S)	Ott, Assistenten
SS 2020	2560554	Fighting Climate Change, Seminar on Morals and Social Behavior (Bachelor)	2 SWS	Seminar (S)	Szech, Zhao
SS 2020	2560556	Designing the Digital Economy, Topics on Political Economy (Bachelor)	2 SWS	Seminar (S)	Szech, Huber
SS 2020	2560557	Designing the Digital Economy, Topics on Political Economy (Master)	2 SWS	Seminar (S)	Szech, Huber
Exams					
WS 19/20	7900103	Data-driven innovation and science communication (Master)		Prüfung (PR)	Ott
WS 19/20	7900132	Seminar in Economics A (Master)		Prüfung (PR)	Fuchs-Seliger
WS 19/20	7900140	Seminar in Economics A (Master)		Prüfung (PR)	Szech, Puppe
WS 19/20	7900186	Seminar Debt, Money and Markets: Economic Narrative and Anthropological Evidence		Prüfung (PR)	Puppe
WS 19/20	7900207	Seminar in Macroeconomics I		Prüfung (PR)	Scheffel
WS 19/20	7900221	Topics in Experimental Economics		Prüfung (PR)	Reiß
WS 19/20	7900259	Seminar in Macroeconomics II		Prüfung (PR)	Scheffel
WS 19/20	7900278	Seminar on Morals and Social Behavior		Prüfung (PR)	Szech, Puppe
WS 19/20	7900281	Seminar in Economics B (Master), Seminar in Economics A (Bachelor)		Prüfung (PR)	Mitusch
WS 19/20	79sefi3	Seminar in Economics B (Master)		Prüfung (PR)	Wigger
SS 2020	7900081	Seminar in Macroeconomics I		Prüfung (PR)	Scheffel

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 Political Economy (Bachelor)** **Seminar (S)**
2560140, WS 19/20, 2 SWS, Language: English, Open in study portal

Content
For Bachelor 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.

For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%). Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

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.

V **Morals & Social Behavior (Bachelor & Master)** **Seminar (S)**
2560141, WS 19/20, 2 SWS, Language: English, Open in study portal

Content
For Bachelor 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.

For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%).

For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally Master students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade.

Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

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.

V **Topics in Political Economy (Master)** **Seminar (S)**
2560142, WS 19/20, 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 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.

For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade. Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

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.

V **Advanced Topics in Econometrics** **Seminar (S)**
2521310, SS 2020, 2 SWS, Language: English, Open in study portal

V **Fighting Climate Change, Seminar on Morals and Social Behavior (Bachelor)** **Seminar (S)**
2560554, SS 2020, 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 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 is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

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 (40%). Additionally students will have to hand in two abstracts with different lenghts (20%). 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.

V **Designing the Digital Economy, Topics on Political Economy (Bachelor)** **Seminar (S)**
2560556, SS 2020, 2 SWS, Language: English, Open in study portal

V **Designing the Digital Economy, Topics on Political Economy (Master)** **Seminar (S)**
2560557, SS 2020, 2 SWS, Language: English, Open in study portal

T 7.355 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2119100	Fördertechnik und Logistiksysteme	SWS	Seminar (S)	Furmans, Pagani
SS 2020	2119100	Fördertechnik und Logistiksysteme	SWS	Seminar (S)	Furmans, Pagani
Exams					
WS 19/20	76-T-MACH-00002	Seminar for Rail System Technology		Prüfung (PR)	Gratzfeld
WS 19/20	76-T-MACH-102135	Conveying Technology and Logistics		Prüfung (PR)	Furmans
WS 19/20	8245100014	Seminar in Transportation		Prüfung (PR)	Vortisch, Chlond
SS 2020	76-T-MACH-00002	Seminar for Rail System Technology		Prüfung (PR)	Gratzfeld
SS 2020	76-T-MACH-102135	Conveying Technology and Logistics		Prüfung (PR)	Furmans

Competence Certificate
See German version.

Prerequisites
See module description.

Recommendation
None

Below you will find excerpts from events related to this course:

V Fördertechnik und Logistiksysteme

2119100, SS 2020, SWS, Open in study portal **Seminar (S)**

Content
The goal of the seminar is to deal with different topics related to the materials handling and logistics. The students can work on the topic either alone or in a group work. At the end the results are presented and discussed with a final presentation. The prepare the work for the seminar an introductory event is scheduled at the beginning.

T 7.356 Course: Seminar in Informatics A (Master) [T-WIWI-103479]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2400125	Security and Privacy Awareness	2 SWS	Seminar (S)	Boehm, Seidel-Saul, Volkamer, Aldag, Gerber, Gottschalk
WS 19/20	2512301	Linked Data and the Semantic Web	3 SWS		Sure-Vetter, Acosta Deibe, Käfer, Heling
WS 19/20	2512311	Real-World Challenges in Data Science and Analytics	3 SWS		Sure-Vetter, Nickel, Weinhardt, Zehnder, Brandt
WS 19/20	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar (S)	Zöllner
WS 19/20	2595470	Seminar Service Science, Management & Engineering	3 SWS	Seminar (S)	Weinhardt, Satzger, Nickel, Fromm, Fichtner, Sure-Vetter
SS 2020	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar (S)	Oberweis, Fritsch, Frister, Schreiber, Schüler, Ullrich
SS 2020	2513309	Seminar Knowledge Discovery and Data Mining (Master)	3 SWS	Seminar (S)	Sure-Vetter, Färber, Nguyen, Noullet , Saier
SS 2020	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar (S)	Sure-Vetter, Riemer, Zehnder
SS 2020	2513403	Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513405	Emerging Trends in Digital Health (Master)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar (S)	Zöllner
SS 2020	2513553	Seminar E-Voting (Master)	2 SWS	Seminar (S)	Beckert, Müller-Quade, Volkamer, Dörre, Düzgün, Kirsten, Schwerdt
SS 2020	2513555	Seminar Security, Usability and Society (Master)	2 SWS	Seminar (S)	Volkamer, Aldag, Reinheimer
SS 2020	2595470	Seminar Service Science, Management & Engineering	2 SWS	Seminar (S)	Weinhardt, Nickel, Fichtner, Satzger, Sure-Vetter, Fromm
Exams					
WS 19/20	7900038	Linked Data and the Semantic Web		Prüfung (PR)	Sure-Vetter
WS 19/20	7900044	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
WS 19/20	7900119	Cognitive automobiles and robots		Prüfung (PR)	Zöllner
WS 19/20	7900129	Security and Privacy Awareness		Prüfung (PR)	Volkamer
WS 19/20	7900187	Real-World Challenges in Data Science und Analytics		Prüfung (PR)	Sure-Vetter
SS 2020	7900092	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
SS 2020	7900128	Emerging Trends in Internet Technologies (Master)		Prüfung (PR)	Sunyaev

SS 2020	7900146	Emerging Trends in Digital Health (Master)	Prüfung (PR)	Sunyaev
SS 2020	7900194	Seminar Mathematics	Prüfung (PR)	Volkamer
SS 2020	7900196	Seminar Business Information Systems (Master)	Prüfung (PR)	Oberweis
SS 2020	7900198	Seminar Data Science & Real-time Big Data Analytics (Master)	Prüfung (PR)	Sure-Vetter
SS 2020	7900200	Seminar E-Voting (Master)	Prüfung (PR)	Volkamer
SS 2020	7900202	Seminar Knowledge Discovery and Data Mining (Master)	Prüfung (PR)	Sure-Vetter
SS 2020	7900218	Seminar Security, Usability and Society (Master)	Prüfung (PR)	Volkamer

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** **Seminar (S)**
2400125, WS 19/20, 2 SWS, Open in study portal

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.

Dates:

- Kick-Off (with topic placing): 25.10.19, 11:30-13:00 Building 5.20 Room 1C-01
- Final version: 10.03.20
- Presentation: 25.03.20

Topics will be assigned at the Kick-Off.

Topics:

- Mass surveillance of communication nodes and chilling effects - a legal and ethical debate (Supervisor: Prof. Seidel, Prof. Boehm, Gottschalk)
- Ethical analysis of so-called attack studies in the context of the survey of security awareness (Supervisor: Prof. Seidel, Prof. Volkamer)
- Privacy awareness in the context of Alexa and Co. (Supervisor: Prof. Boehm, Gottschalk, Prof. Volkamer, Aldag)
- Security awareness in the context of 2 factor authentication when paying with credit cards on the Internet (Supervisor: Prof. Volkamer, Aldag)
- What is the worth of privacy? (Supervisor: Prof. Seidel)
- Processing Social Media Content for Law Enforcement (Supervisor: Prof. Boehm, Gottschalk)

ATTENTION: The seminar is only for MASTER students!

V Linked Data and the Semantic Web

2512301, WS 19/20, 3 SWS, Language: German/English, Open in study portal

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 Real-World Challenges in Data Science and Analytics

2512311, WS 19/20, 3 SWS, Language: German/English, Open in study portal

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 Cognitive Automobiles and Robots

2513500, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

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.

V Seminar Service Science, Management & Engineering

2595470, WS 19/20, 3 SWS, Language: German, Open in study portal

Seminar (S)

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis (15-20 pages), a presentation and active participation in class.

The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Learning objectives:

The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Recommendations:

Lecture *eServices* [2595466] is recommended.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Basisliteratur wird entsprechend der zu bearbeitenden Themen bereitgestellt.

V Seminar Knowledge Discovery and Data Mining (Master)

2513309, SS 2020, 3 SWS, Language: English, Open in study portal

Seminar (S)

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

The exact dates and information for registration will be announced at the event page.

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 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
In this practical 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.

V Cognitive Automobiles and Robots

2513500, SS 2020, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

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.

V Seminar E-Voting (Master)

2513553, SS 2020, 2 SWS, Open in study portal

Seminar (S)

Content
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).

V Seminar Security, Usability and Society (Master)

2513555, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
Seminar:

The main topic of this seminar is security, usability, and society. The goal is to analyze these topics from different perspectives. Always important is the human, as we are interested in how humans interact with certain problems and how it might be possible to tackle it. For instance, phishing detection, how is it possible to ensure a higher detection. To tackle this problem, you can either focus on the technical side, awareness training, regulations by organizations.

Further important information:

Because of the current situation, every meeting will be held online. This might change during the semester, depending on the course of the corona situation.

Important dates:

- Kick-Off 22.04
- Final submission 01.07
- Presentation 14.07

Topics:

Will be announced on the 30.03

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).

V Seminar Service Science, Management & Engineering

2595470, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Learning objectives:

The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Recommendations:

Lecture *eServices* [2595466] is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Literature
Die Basisliteratur wird entsprechend der zu bearbeitenden Themen bereitgestellt.

T 7.357 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2400125	Security and Privacy Awareness	2 SWS	Seminar (S)	Boehm, Seidel-Saul, Volkamer, Aldag, Gerber, Gottschalk
WS 19/20	2512301	Linked Data and the Semantic Web	3 SWS		Sure-Vetter, Acosta Deibe, Käfer, Heling
WS 19/20	2512311	Real-World Challenges in Data Science and Analytics	3 SWS		Sure-Vetter, Nickel, Weinhardt, Zehnder, Brandt
WS 19/20	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar (S)	Zöllner
WS 19/20	2595470	Seminar Service Science, Management & Engineering	3 SWS	Seminar (S)	Weinhardt, Satzger, Nickel, Fromm, Fichtner, Sure-Vetter
SS 2020	2513211	Seminar Business Information Systems (Master)	2 SWS	Seminar (S)	Oberweis, Fritsch, Frister, Schreiber, Schüler, Ullrich
SS 2020	2513309	Seminar Knowledge Discovery and Data Mining (Master)	3 SWS	Seminar (S)	Sure-Vetter, Färber, Nguyen, Noullet , Saier
SS 2020	2513311	Seminar Data Science & Real-time Big Data Analytics (Master)	2 SWS	Seminar (S)	Sure-Vetter, Riemer, Zehnder
SS 2020	2513403	Emerging Trends in Internet Technologies (Master)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513405	Emerging Trends in Digital Health (Master)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar (S)	Zöllner
SS 2020	2513553	Seminar E-Voting (Master)	2 SWS	Seminar (S)	Beckert, Müller-Quade, Volkamer, Dörre, Düzgün, Kirsten, Schwerdt
SS 2020	2513555	Seminar Security, Usability and Society (Master)	2 SWS	Seminar (S)	Volkamer, Aldag, Reinheimer
SS 2020	2595470	Seminar Service Science, Management & Engineering	2 SWS	Seminar (S)	Weinhardt, Nickel, Fichtner, Satzger, Sure-Vetter, Fromm
Exams					
WS 19/20	7500175	Seminar: Energy Informatics		Prüfung (PR)	Wagner
WS 19/20	7500220	Seminar Ubiquitous Computing		Prüfung (PR)	Beigl
WS 19/20	7900038	Linked Data and the Semantic Web		Prüfung (PR)	Sure-Vetter
WS 19/20	7900044	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
WS 19/20	7900119	Cognitive automobiles and robots		Prüfung (PR)	Zöllner
WS 19/20	7900129	Security and Privacy Awareness		Prüfung (PR)	Volkamer
WS 19/20	7900187	Real-World Challenges in Data Science und Analytics		Prüfung (PR)	Sure-Vetter
SS 2020	7900092	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter

SS 2020	7900128	Emerging Trends in Internet Technologies (Master)	Prüfung (PR)	Sunyaev
SS 2020	7900146	Emerging Trends in Digital Health (Master)	Prüfung (PR)	Sunyaev
SS 2020	7900194	Seminar Mathematics	Prüfung (PR)	Volkamer
SS 2020	7900196	Seminar Business Information Systems (Master)	Prüfung (PR)	Oberweis
SS 2020	7900198	Seminar Data Science & Real-time Big Data Analytics (Master)	Prüfung (PR)	Sure-Vetter
SS 2020	7900200	Seminar E-Voting (Master)	Prüfung (PR)	Volkamer
SS 2020	7900202	Seminar Knowledge Discovery and Data Mining (Master)	Prüfung (PR)	Sure-Vetter
SS 2020	7900218	Seminar Security, Usability and Society (Master)	Prüfung (PR)	Volkamer

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** **Seminar (S)**
2400125, WS 19/20, 2 SWS, Open in study portal

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.

Dates:

- Kick-Off (with topic placing): 25.10.19, 11:30-13:00 Building 5.20 Room 1C-01
- Final version: 10.03.20
- Presentation: 25.03.20

Topics will be assigned at the Kick-Off.

Topics:

- Mass surveillance of communication nodes and chilling effects - a legal and ethical debate (Supervisor: Prof. Seidel, Prof. Boehm, Gottschalk)
- Ethical analysis of so-called attack studies in the context of the survey of security awareness (Supervisor: Prof. Seidel, Prof. Volkamer)
- Privacy awareness in the context of Alexa and Co. (Supervisor: Prof. Boehm, Gottschalk, Prof. Volkamer, Aldag)
- Security awareness in the context of 2 factor authentication when paying with credit cards on the Internet (Supervisor: Prof. Volkamer, Aldag)
- What is the worth of privacy? (Supervisor: Prof. Seidel)
- Processing Social Media Content for Law Enforcement (Supervisor: Prof. Boehm, Gottschalk)

ATTENTION: The seminar is only for MASTER students!

V Linked Data and the Semantic Web

2512301, WS 19/20, 3 SWS, Language: German/English, Open in study portal

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 Real-World Challenges in Data Science and Analytics

2512311, WS 19/20, 3 SWS, Language: German/English, Open in study portal

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 Cognitive Automobiles and Robots

2513500, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

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.

V Seminar Service Science, Management & Engineering

2595470, WS 19/20, 3 SWS, Language: German, Open in study portal

Seminar (S)

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis (15-20 pages), a presentation and active participation in class.

The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Learning objectives:

The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Recommendations:

Lecture *eServices* [2595466] is recommended.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Basisliteratur wird entsprechend der zu bearbeitenden Themen bereitgestellt.

V Seminar Knowledge Discovery and Data Mining (Master)

2513309, SS 2020, 3 SWS, Language: English, Open in study portal

Seminar (S)

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

The exact dates and information for registration will be announced at the event page.

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 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
In this practical 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.

V Cognitive Automobiles and Robots

2513500, SS 2020, 2 SWS, Language: German/English, Open in study portal

Seminar (S)

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.

V Seminar E-Voting (Master)

2513553, SS 2020, 2 SWS, Open in study portal

Seminar (S)

Content
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).

V Seminar Security, Usability and Society (Master)

2513555, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
Seminar:

The main topic of this seminar is security, usability, and society. The goal is to analyze these topics from different perspectives. Always important is the human, as we are interested in how humans interact with certain problems and how it might be possible to tackle it. For instance, phishing detection, how is it possible to ensure a higher detection. To tackle this problem, you can either focus on the technical side, awareness training, regulations by organizations.

Further important information:

Because of the current situation, every meeting will be held online. This might change during the semester, depending on the course of the corona situation.

Important dates:

- Kick-Off 22.04
- Final submission 01.07
- Presentation 14.07

Topics:

Will be announced on the 30.03

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).

V Seminar Service Science, Management & Engineering

2595470, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Learning objectives:

The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Recommendations:

Lecture *eServices* [2595466] is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Literature
Die Basisliteratur wird entsprechend der zu bearbeitenden Themen bereitgestellt.

T 7.358 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack, Sinske
WS 19/20	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar (S)	Nickel, Mitarbeiter
SS 2020	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack
SS 2020	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar (S)	Nickel, Mitarbeiter
Exams					
WS 19/20	7900012_WS1920	Seminar in Operations Research A (Master)		Prüfung (PR)	Stein
WS 19/20	7900156	Modern OR and Innovative Logistics		Prüfung (PR)	Nickel
WS 19/20	7900212	Real-World Challenges in Data Science und Analytics		Prüfung (PR)	Nickel
WS 19/20	7900314	Seminar in Operations Research A (Master)		Prüfung (PR)	Rebennack

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: Modern OR and Innovative Logistics

2550491, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V

Seminar: Modern OR and Innovative Logistics

2550491, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:

If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:

The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

T 7.359 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack, Sinske
WS 19/20	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar (S)	Nickel, Mitarbeiter
SS 2020	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack
SS 2020	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar (S)	Nickel, Mitarbeiter
Exams					
WS 19/20	7900158	Modern OR and Innovative Logistics		Prüfung (PR)	Nickel

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: Modern OR and Innovative Logistics

2550491, WS 19/20, 2 SWS, Language: German, Open in study portal — **Seminar (S)**

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.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

V Seminar: Modern OR and Innovative Logistics

2550491, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

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.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:

The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:

If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:

The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

T 7.360 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2020	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Krüger, Buse, Görgen

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 Advanced Topics in Econometrics

2521310, SS 2020, 2 SWS, Language: English, Open in study portal — **Seminar (S)**

T 7.361 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2020	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Krüger, Buse, Görgen

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 Advanced Topics in Econometrics

2521310, SS 2020, 2 SWS, Language: English, Open in study portal — **Seminar (S)**

T 7.362 Course: Seminar in Transportation [T-BGU-100014]

Responsible: 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
M-WIWI-101808 - Seminar Module

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	6232903	Seminar Verkehrswesen	2 SWS	Seminar (S)	Vortisch, KIT
SS 2020	6232903	Seminar Verkehrswesen	2 SWS	Seminar (S)	Vortisch, Kagerbauer
Exams					
WS 19/20	8245100014	Seminar in Transportation		Prüfung (PR)	Vortisch, Chlond

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 7.363 Course: Seminar Mobility Services (Master) [T-WIWI-103174]

Responsible: Prof. Dr. Gerhard Satzger
Carola Stryja

Organisation: KIT Department of Economics and Management

Part of: M-BGU-101064 - Fundamentals of Transportation
M-BGU-101065 - Transportation Modelling and Traffic Management

Type	Credits	Recurrence	Version
Examination of another type	3	Irregular	1

Competence Certificate
A final written exam will be conducted.

Prerequisites
None

Annotation
The course is not offered regularly.

T 7.364 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	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2020	2149665	Seminar Production Technology	1 SWS	Seminar (S)	Fleischer, Lanza, Schulze, Zanger
Exams					
WS 19/20	76-T-MACH-109062	Seminar Production Technology		Prüfung (PR)	Fleischer, Lanza, Schulze

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 2020, 1 SWS, Language: German, Open in study portal

Seminar (S)

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

T 7.365 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
M-ETIT-101159 - Sensor Technology II

Type	Credits	Version
Examination of another type	3	1

Events					
WS 19/20	2304233	Seminar Sensor Technology	2 SWS	Seminar (S)	Menesklou
SS 2020	2304233	Seminar Sensorik	2 SWS	Seminar (S)	Menesklou
Exams					
WS 19/20	7304233	Seminar Sensors		Prüfung (PR)	Menesklou
SS 2020	7304233	Seminar Sensors		Prüfung (PR)	Menesklou

T 7.366 Course: Seminar: Governance, Risk & Compliance [T-INFO-102047]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

Type	Credits	Version
Examination of another type	3	1

Events					
SS 2020	2400041	Governance, Risk & Compliance	2 SWS	Seminar (S)	Herzig
Exams					
SS 2020	7500140	Seminar: Legal Studies I		Prüfung (PR)	Dreier, Boehm, Melullis, Matz

T 7.367 Course: Seminar: Legal Studies I [T-INFO-101997]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
WS 19/20	24389	IT-Sicherheit und Recht	2 SWS	Seminar (S)	Schallbruch
SS 2020	2400041	Governance, Risk & Compliance	2 SWS	Seminar (S)	Herzig
SS 2020	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar (S)	Bless, Boehm, Hartenstein, Mädche, Sunyaev, Zitterbart
SS 2020	2400153	Online Manipulative Practices: New Technologies and Fundamental Rights Infringements	2 SWS	Seminar (S)	Boehm
SS 2020	24820	Current Issues in Patent Law	2 SWS	Seminar (S)	Melullis
Exams					
WS 19/20	7500035	Seminar: Legal Studies II		Prüfung (PR)	Barczak
WS 19/20	7500182	Seminar: Legal Studies II		Prüfung (PR)	Dreier, Boehm, Raabe
SS 2020	7500140	Seminar: Legal Studies I		Prüfung (PR)	Dreier, Boehm, Melullis, Matz
SS 2020	7500159	Seminar: Legal Studies I		Prüfung (PR)	Eichenhofer

Below you will find excerpts from events related to this course:

V Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung

Seminar (S)

2400061, SS 2020, 2 SWS, Open in study portal

Content
Registration via https://portal.wiwi.kit.edu/ys/2708

V Online Manipulative Practices: New Technologies and Fundamental Rights Infringements

Seminar (S)

2400153, SS 2020, 2 SWS, Open in study portal

Content
New science-based technologies are fostering the process of making individuals more amenable to forms of manipulation online. The more technological capabilities improve, the more surveillance expands, the life of individuals becomes transparent, easier to predict and therefore easier to manipulate. More invasive practices lead to infringements of fundamental rights, which are not always easy to detect, as surveillance and manipulation techniques are getting more sophisticated and less obvious. After the now notorious Cambridge Analytica data scandal, we have now hard evidence individuals are exposed to manipulative practices online, which are most of the time difficult to detect as they operate silently and automatically. Manipulative practices aim at covertly subverting another person´s capacity for conscious decision-making by exploiting in particular his/her cognitive, emotional, or other decision-making vulnerabilities. They involve influences that (1) are hidden, (2) exploit vulnerabilities, and (3) are targeted. The seminar has the objective to discuss a series of new technologies and techniques that are and can be used in online manipulative practices and analyse their legal and ethical implications. Special attention is dedicated to the risk such practices pose to fundamental rights such as the right to privacy, the right to the protection of personal data and the right to non-discrimination.

10 sub-topics are provided below. It is a list of new technologies and techniques that can be used in manipulative practices. Students should pick one sub-topic in order to write a short paper and prepare a presentation. Students work is guided through a series of questions and a list of recommended literature. In short, papers and presentations should be generally structured in this way:

- Describe the technology/techniques.
- Describe the legal and ethical implications stemming from the use and application of the selected technology/techniques. What fundamental rights are at stake?
- Focus on one legal aspect, for example the infringement of the right to privacy, (the sub-topic title and description and list of literature already guide the student in this sense), analyse the current legal framework concerning the protection of that right and describe the legal challenges that these new technologies and methods pose.

We also encourage students to investigate possible technical solutions to the problems highlighted in their analysis.

T 7.368 Course: Seminar: Legal Studies II [T-INFO-105945]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Examination of another type	3	1

Events					
WS 19/20	2400014	Current Issues in Patent Law	2 SWS	Seminar (S)	Melullis
WS 19/20	2400125	Security and Privacy Awareness	2 SWS	Seminar (S)	Boehm, Seidel-Saul, Volkamer, Aldag, Gerber, Gottschalk
WS 19/20	24186	Patents at the point of intersection between technology, economy and law	2 SWS	Seminar (S)	Dammler
WS 19/20	24389	IT-Sicherheit und Recht	2 SWS	Seminar (S)	Schallbruch
SS 2020	2400061	Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung	2 SWS	Seminar (S)	Bless, Boehm, Hartenstein, Mädche, Sunyaev, Zitterbart
Exams					
WS 19/20	7500035	Seminar: Legal Studies II		Prüfung (PR)	Barczak
WS 19/20	7500182	Seminar: Legal Studies II		Prüfung (PR)	Dreier, Boehm, Raabe

Below you will find excerpts from events related to this course:

V Security and Privacy Awareness

2400125, WS 19/20, 2 SWS, Open in study portal **Seminar (S)**

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.

Dates:

- Kick-Off (with topic placing): 25.10.19, 11:30-13:00 Building 5.20 Room 1C-01
- Final version: 10.03.20
- Presentation: 25.03.20

Topics will be assigned at the Kick-Off.

Topics:

- Mass surveillance of communication nodes and chilling effects - a legal and ethical debate (Supervisor: Prof. Seidel, Prof. Boehm, Gottschalk)
- Ethical analysis of so-called attack studies in the context of the survey of security awareness (Supervisor: Prof. Seidel, Prof. Volkamer)
- Privacy awareness in the context of Alexa and Co. (Supervisor: Prof. Boehm, Gottschalk, Prof. Volkamer, Aldag)
- Security awareness in the context of 2 factor authentication when paying with credit cards on the Internet (Supervisor: Prof. Volkamer, Aldag)
- What is the worth of privacy? (Supervisor: Prof. Seidel)
- Processing Social Media Content for Law Enforcement (Supervisor: Prof. Boehm, Gottschalk)

ATTENTION: The seminar is only for MASTER students!

V **Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung** **Seminar (S)**
2400061, SS 2020, 2 SWS, Open in study portal

Content
Registration via https://portal.wiwi.kit.edu/ys/2708

T 7.369 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2304231	Sensors	2 SWS	Lecture (V)	Menesklou
Exams					
WS 19/20	7304231	Sensors		Prüfung (PR)	Menesklou
SS 2020	7304231	Sensors		Prüfung (PR)	Menesklou

T 7.370 Course: Sensors and Actuators Laboratory [T-ETIT-100706]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101158 - Sensor Technology I
M-ETIT-101159 - Sensor Technology II

Type	Credits	Recurrence	Version
Examination of another type	6	Each summer term	1

Exams				
SS 2020	7304232	Sensors and Actuators Laboratory	Prüfung (PR)	Menesklou

T 7.371 Course: Service Analytics A [T-WIWI-105778]

Responsible: Prof. Dr. Hansjörg Fromm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101470 - Data Science: Advanced CRM
M-WIWI-101506 - Service Analytics

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	2

Events					
SS 2020	2595501	Service Analytics A	3 SWS	Lecture (V)	Schmitz
Exams					
WS 19/20	7900086	Service Analytics A		Prüfung (PR)	Fromm

Competence Certificate
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation.

Prerequisites
None

Recommendation
The lecture is addresed to students with interests and basic knowledge in the topics of Operations Research, decritptive and inductive statistics.

Annotation
This course is admission restricted.

Below you will find excerpts from events related to this course:

V Service Analytics A

2595501, SS 2020, 3 SWS, Language: English, Open in study portal

Lecture (V)

Content

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.

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

Due to the practical group sessions in the course, the number of participants is limited. Further information on the application process can be found on the course website (https://dsi.iism.kit.edu/64_411.php).

Please apply via the WiWi Portal until April 17, 2020: https://portal.wiwi.kit.edu/ys/3539

Literature

- Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. *The elements of statistical learning*. Vol. 1. No. 10. New York: Springer series in statistics, 2001.

T 7.372 Course: Service Design Thinking [T-WIWI-102849]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101503 - Service Design Thinking

Type	Credits	Recurrence	Version
Examination of another type	12	Irregular	4

Competence Certificate
Alternative exam assessment.

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.

T 7.373 Course: Service Innovation [T-WIWI-102641]

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-102806 - Service Innovation, Design & Engineering

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2595468	Service Innovation	2 SWS	Lecture (V)	Satzger
Exams					
WS 19/20	7900252	Service Innovation		Prüfung (PR)	Satzger

Competence Certificate
The assessment consists of a written exam (60 min.). A bonus can be acquired through successful participation in the exercise. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by one grade (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 Service Innovation

2595468, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
While innovation in manufacturing or agriculture can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice - while many organizations have a well-understood process for innovating in the product business - innovating in services is often still a fuzzy and complex undertaking.

In this lecture we will

- discuss the state of research
- compare product and service innovation
- understand how innovation diffusion works
- examine case studies of service innovation
- compare open vs. closed innovation
- learn how to leverage user communities to drive innovation and
- understand obstacles, and enablers and how to manage, incentivize and foster service innovation

Literature

- Cardoso, J., Fromm, H., Nickel, S., Satzger, G., Studer, R., & Weinhardt, C. (Eds.). (2015). Fundamentals of service systems (Vol. 12). Heidelberg: Springer.
- Lusch, R. F., & Nambisan, S. (2015). Service innovation: A service-dominant logic perspective. MIS quarterly, 39(1).
- Christensen, Clayton M. (2003).The Innovator's Dilemma - when new technologies cause great firms to fail. Boston, Massachusetts:Harvard Business Review Press.
- Rogers, S. (2003). Diffusion of innovations. 5. ed. New York: Free Press.
- Chesbrough, H. W. (2011). Open services innovation - rethinking your business to grow and compete in a new era. 1. ed. San Francisco: Jossey-Bass.
- Uebernickel, F., Brenner, W., Pukall, B., Naef, T., & Schindlholzer, B. (2015). Design Thinking: Das Handbuch. Frankfurt am Main: Frankfurter Allgemeine Buch.
- Runco, M.A. (2014). Creativity – Theories and Themes: Research, Development, and Practice. 2. ed. Amsterdam: Academic Press

T 7.374 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	Recurrence	Version
Examination of another type	3	Each winter term	1

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 7.375 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	Recurrence	Version
Examination of another type	3	Each winter term	1

Events					
WS 19/20	2545082	SIL Entrepreneurship Project	2-4 SWS	Seminar (S)	Mitarbeiter
SS 2020	2545082	SIL Entrepreneurship Project	2-4 SWS	Seminar (S)	Mitarbeiter
Exams					
WS 19/20	7900037	SIL Entrepreneurship Project		Prüfung (PR)	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 7.376 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	Recurrence	Version
Examination of another type	3	Each summer term	1

Events					
SS 2020	2581025	Simulation Game in Energy Economics	3 SWS	Lecture / Practice (VÜ)	Genoese, Zimmermann

Competence Certificate
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Prerequisites
None

Recommendation
Visiting the course "Introduction to Energy Economics"

Annotation
See German version.

Below you will find excerpts from events related to this course:

V Simulation Game in Energy Economics

2581025, SS 2020, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

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.

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 7.377 Course: Simulation of Coupled Systems [T-MACH-105172]

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	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2020	2114095	Simulation of Coupled Systems	2 SWS	Lecture (V)	Geimer, Xiang
Exams					
WS 19/20	76T-MACH-105172	Simulation of Coupled Systems		Prüfung (PR)	Geimer
WS 19/20	76-T-MACH-105172	Simulation of Coupled Systems		Prüfung (PR)	Geimer
SS 2020	76T-MACH-105172	Simulation of Coupled Systems		Prüfung (PR)	Geimer

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.378 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	Recurrence	Version
Completed coursework	0	Each summer term	1

Exams				
WS 19/20	76-T-MACH-108888	Simulation of Coupled Systems - Advance	Prüfung (PR)	Geimer
SS 2020	76-T-MACH-108888	Simulation of Coupled Systems - Advance	Prüfung (PR)	Geimer

Competence Certificate
Preparation of semester report

Prerequisites
none

T 7.379 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	Recurrence	Version
Oral examination	1,5	Each summer term	1

Events					
SS 2020	6241807	Bauleitung	1 SWS	Lecture (V)	Steffek
Exams					
WS 19/20	8240103427	Site Management		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.380 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	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2581023	(Smart) Energy Infrastructure	2 SWS	Lecture (V)	Ardone, Pustisek, Jochem
Exams					
WS 19/20	7981023	Smart Energy Infrastructure		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Annotation
New course starting winter term 2017/2018.

Below you will find excerpts from events related to this course:

V (Smart) Energy Infrastructure

2581023, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content

- Basic terms and concepts
- Meaning of infrastructure
- Excursus: regulation of infrastructure
- Natural gas transportation
- Natural gas storage
- Electricity transmission
- (Overview) Crude oil and oil product transportation

T 7.381 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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2540452	Smart Grid Applications	2 SWS	Lecture (V)	Staudt, van Dinther
WS 19/20	2540453	Übung zu Smart Grid Applications	1 SWS	Lecture (V)	Staudt, Golla
Exams					
WS 19/20	7900235	Smart Grid Applications		Prüfung (PR)	Weinhardt
WS 19/20	7900308	Smart Grid Applications		Prüfung (PR)	Weinhardt

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 be read for the first time in winter term 2018/19.

T 7.382 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2520537	Social Choice Theory	2 SWS	Lecture (V)	Puppe
SS 2020	2520539	Übung zu Social Choice Theory	1 SWS	Practice (Ü)	Puppe, Kretz

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

Below you will find excerpts from events related to this course:

V Social Choice Theory

2520537, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Literature
Basisliteratur:

- Herve´ 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.

weiterführende Literatur:

- 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 7.383 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	Recurrence	Version
Examination of another type	4,5	Each term	2

Events					
WS 19/20	2512400	Sociotechnical Information Systems Development	3 SWS	Practical course (P)	Sunyaev, Sturm
SS 2020	2512400	Development of Sociotechnical Information Systems (Bachelor)	3 SWS	Practical course (P)	Sunyaev, Sturm
SS 2020	2512401	Development of Sociotechnical Information Systems (Master)	3 SWS	Practical course (P)	Sunyaev, Sturm
Exams					
WS 19/20	7900115	Development of Sociotechnical Information Systems		Prüfung (PR)	Sunyaev
SS 2020	7900173	Development of Sociotechnical Information Systems (Master)		Prüfung (PR)	Sunyaev

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 Sociotechnical Information Systems Development

2512400, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

Content
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Learning objectives:

- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

V Development of Sociotechnical Information Systems (Bachelor)

2512400, SS 2020, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

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

Development of Sociotechnical Information Systems (Master)

2512401, SS 2020, 3 SWS, Language: German/English, Open in study portal

Practical course (P)

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 7.384 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	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2511208	Software Quality Management	2 SWS	Lecture (V)	Oberweis
SS 2020	2511209	Übungen zu Software-Qualitätsmanagement	1 SWS	Practice (Ü)	Oberweis, Frister
Exams					
WS 19/20	7900027	Software Quality Management		Prüfung (PR)	Oberweis
SS 2020	7900031	Software Quality Management (Registration until 13 July 2020)		Prüfung (PR)	Oberweis

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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.385 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561260	Spatial Economics	2 SWS	Lecture (V)	Ott
WS 19/20	2561261		1 SWS	Practice (Ü)	Ott, Bälz
Exams					
WS 19/20	7900075	Spatial Economics		Prüfung (PR)	Ott

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

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. The attendance of the course "Introduction to economic policy" [2560280] is recommended.

Annotation
Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

Below you will find excerpts from events related to this course:

V Spatial Economics

2561260, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.386 Course: Special Topics in Highway Engineering and Environmental Impact Assessment [T-BGU-101860]

Responsible: Prof. Dr.-Ing. Ralf Roos
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-100999 - Highway Engineering

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6233804	Umweltverträglichkeitsstudien im Straßenwesen	1 SWS	Lecture (V)	Roos
SS 2020	6233807	Besondere Kapitel im Straßenwesen	1 SWS	Lecture (V)	Roos

Competence Certificate
oral exam with 15 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.387 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

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each term	2

Exams				
WS 19/20	7900263	Special Topics in Information Systems	Prüfung (PR)	Weinhardt

Competence Certificate
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted pracitical 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
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 Management and Engineering” 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 7.388 Course: Specialization in Food Process Engineering [T-CIWVT-101875]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101119 - Specialization in Food Process Engineering

Type	Credits	Version
Oral examination	9	1

Events					
WS 19/20	22207	Lebensmittelkunde und -funktionalität	2 SWS	Lecture (V)	Watzl
WS 19/20	22209		1 SWS	Lecture (V)	van der Schaaf
WS 19/20	22246	Extrusion technology in food processing	1 SWS	Lecture (V)	Emin
SS 2020	22633	Microbiology for Engineers	2 SWS	Lecture (V)	Schwartz
SS 2020	6601	Grundlagen der Lebensmittelchemie I	2 SWS	Lecture (V)	Bunzel

Prerequisites
The Module "Principles of Food Process Engineering" must be passed.

T 7.389 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2521350	Statistical Modeling of Generalized Regression Models	2 SWS	Lecture (V)	Heller
Exams					
WS 19/20	7900146	Statistical Modeling of generalized regression models		Prüfung (PR)	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 19/20, 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 7.390 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2521331	Stochastic Calculus and Finance	2 SWS	Lecture (V)	Safarian
Exams					
WS 19/20	7900225	Stochastic Calculus and Finance		Prüfung (PR)	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 19/20, 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

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 7.391 Course: Strategic Finance and Technoloy Change [T-WIWI-110511]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Written examination	1,5	Each winter term	1

Events					
WS 19/20	2530214	Strategic Finance and Technology Change	1 SWS	Lecture (V)	N.N.
Exams					
WS 19/20	7900219	Strategic Finance and Technoloy Change		Prüfung (PR)	Ruckes

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. 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.

Prerequisites
None

Recommendation
Attending the lecture "Financial Management" is strongly recommended.

T 7.392 Course: Strategic Management of Information Technology [T-WIWI-102669]

Responsible: Thomas Wolf
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	Recurrence	Version
Written examination	4,5	Each summer term	2

Exams				
WS 19/20	7900030	Strategic Management of Information Technology	Prüfung (PR)	Wolf
SS 2020	7900034	Strategic Management of Information Technology (Registration until 13 July 2020)	Prüfung (PR)	Wolf

Competence Certificate
Please note that the exam for first writers will be offered for the last time in winter semester 2019/2020. A last examination possibility exists in the summer semester 2020 (only for repeaters).

The assessment of this course is a written (60 min.) or (if necessary) oral examination according (30 min.) to §4(2) of the examination regulation.

Prerequisites
None

T 7.393 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	6232808	Strategische Verkehrsplanung	2 SWS	Lecture (V)	Waßmuth
Exams					
WS 19/20	8240103426	Strategic Transport Planning		Prüfung (PR)	Vortisch

Prerequisites
None

Recommendation
None

Annotation
None

T 7.394 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
WS 19/20	2577921	Strategy and Management Theory: Developments and "Classics" (Master)	2 SWS	Seminar (S)	Lindstädt
SS 2020	2577921	Strategy and Management Theory: Developments and "Classics" (Master)	2 SWS	Seminar (S)	Lindstädt
Exams					
WS 19/20	7900120	Strategy and Management Theory: Developments and “Classics”		Prüfung (PR)	Lindstädt

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)

2577921, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

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 final meeting. Details on the design of the success control will be announced during the lecture.

Note:

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. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

V

Strategy and Management Theory: Developments and "Classics" (Master)

2577921, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

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 final meeting. Details on the design of the success control will be announced during the lecture.

Note:

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. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

T 7.395 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2125763	Structural and phase analysis	2 SWS	Lecture (V)	Wagner, Hinterstein
Exams					
WS 19/20	76-T-MACH-102170	Structural and Phase Analysis		Prüfung (PR)	Wagner, Hinterstein

Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events related to this course:

V Structural and phase analysis

2125763, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature

1. Moderne Röntgenbeugung - Röntgendiffraktometrie für Materialwissenschaftler, Physiker und Chemiker, Spieß, Lothar / Schwarzer, Robert / Behnken, Herfried / Teichert, Gerd B.G. Teubner Verlag 2005
2. H. Krischner: Einführung in die Röntgenfeinstrukturanalyse. Vieweg 1990.
3. B.D. Cullity and S.R. Stock: Elements of X-ray diffraction. Prentice Hall New Jersey, 2001.

T 7.396 Course: Structural Ceramics [T-MACH-102179]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	2126775	Structural Ceramics	2 SWS	Lecture (V)	Hoffmann
Exams					
WS 19/20	76-T-MACH-102179	Structural Ceramics		Prüfung (PR)	Hoffmann, Wagner, Schell

Competence Certificate
Oral examination, 20 min

Prerequisites
none

Below you will find excerpts from events related to this course:

V Structural Ceramics

2126775, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
W.D. Kingery, H.K. Bowen, D.R. Uhlmann, "Introduction to Ceramics", John Wiley & Sons, New York, (1976)

E. Dörre, H. Hübner, "Aluminia", Springer Verlag Berlin, (1984)

M. Barsoum, "Fundamentals of Ceramics", McGraw-Hill Series in Material Science and Engineering (2003)

T 7.397 Course: Superhard Thin Film Materials [T-MACH-102103]

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

Part of: M-MACH-101268 - Specific Topics in Materials Science

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2177618	Superhard Thin Film Materials	2 SWS	Lecture (V)	Ulrich
Exams					
WS 19/20	76-T-MACH-102103	Superhard Thin Film Materials		Prüfung (PR)	Ulrich

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

2177618, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.398 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	Recurrence	Version
Written examination	4,5	Each term	1

Competence Certificate
The assessment of this course is a written examination (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Prerequisites
None

T 7.399 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	Recurrence	Version
Written examination	4,5	Each term	1

Competence Certificate
The assessment consists of an 1h written exam in the first week after lecture period.

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 7.400 Course: Supplementary Claim Management [T-BGU-103428]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-101888 - Project Management in Construction

Type	Credits	Recurrence	Version
Oral examination	1,5	Each summer term	1

Events					
SS 2020	6241811	Nachtragsmanagement	1 SWS	Lecture (V)	Haghsheno, Pietsch
Exams					
WS 19/20	8240103428	Supplementary Claim Management		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.401 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	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581957	Supply Chain Management in the automotive industry	2 SWS	Lecture (V)	Lang, Heupel
Exams					
WS 19/20	7981957	Supply Chain Management in the Automotive Industry		Prüfung (PR)	Schultmann

Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Supply Chain Management in the automotive industry

2581957, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content

- Automotive industry significance
- The automotive supply chain
- Adding value structures of the automotive supply chain and mastering of the production systems as factors of success in the SCM
- Strategic procurement logistics
- Risk management
- Quality engineering and management in the automotive supply chain
- Cost engineering and management in the automotive supply chain
- Purchasing (Supplier selection, contract management)
- Performance measurement of the supply chain
- Organization

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.402 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	Recurrence	Version
Written examination	3,5	Each summer term	1

Events					
SS 2020	2581961	Supply Chain Management with Advanced Planning Systems	2 SWS	Lecture (V)	Göbelt, Bosch
Exams					
WS 19/20	7981961	Supply Chain Management with Advanced Planning Systems		Prüfung (PR)	Schultmann

Competence Certificate
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (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
None

Below you will find excerpts from events related to this course:

V Supply Chain Management with Advanced Planning Systems

2581961, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 7.403 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	Recurrence	Version
Written examination	4	Each summer term	3

Events					
SS 2020	2174576	Systematic Materials Selection	3 SWS	Lecture (V)	Dietrich
SS 2020	2174577	Übungen zu 'Systematische Werkstoffauswahl'	1 SWS	Practice (Ü)	Dietrich, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-100531	Systematic Materials Selection		Prüfung (PR)	Dietrich

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 2020, 3 SWS, Language: German, Open in study portal

Lecture (V)

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 7.404 Course: Tax Law I [T-INFO-101315]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	24168	Tax Law I	2 SWS	Lecture (V)	Dietrich
Exams					
WS 19/20	7500066	Tax Law I		Prüfung (PR)	Dreier, Matz
SS 2020	7500052	Tax Law I		Prüfung (PR)	Dreier, Matz

T 7.405 Course: Tax Law II [T-INFO-101314]

Responsible: Detlef Dietrich
Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101216 - Private Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	24646	Tax Law II	2 SWS	Lecture (V)	Dietrich
Exams					
WS 19/20	7500067	Tax Law II		Prüfung (PR)	Dreier, Matz
SS 2020	7500053	Tax Law II		Prüfung (PR)	Dreier, Matz

T 7.406 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	Recurrence	Version
Examination of another type	3	Each winter term	2

Events					
WS 19/20	2545106	Technologies for Innovation Management	2 SWS	Block (B)	Koch
Exams					
WS 19/20	7900239	Technologies for Innovation Management		Prüfung (PR)	Weissenberger-Eibl

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.

Below you will find excerpts from events related to this course:

V Technologies for Innovation Management

2545106, WS 19/20, 2 SWS, Language: German, Open in study portal

Block (B)

Content
The seminar “Technologies for Innovation Management” will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.

T 7.407 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	Recurrence	Version
Examination of another type	3	see Annotations	1

Exams				
SS 2020	7900238	Technology Assessment	Prüfung (PR)	Weissenberger-Eibl

Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.

T 7.408 Course: Telecommunication and Internet Economics [T-WIWI-102713]

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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561232	Telecommunication and Internet Economics	2 SWS	Lecture (V)	Mitusch
WS 19/20	2561233	Übung zu Telekommunikations- und Internetökonomie	1 SWS	Practice (Ü)	Mitusch, Wisotzky
Exams					
WS 19/20	7900296	Telecommunication and Internet Economics		Prüfung (PR)	Mitusch

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
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor's degree) are expected.

Particularly helpful but not necessary: Industrial Economics. Prior attendance of the lecture „Competition in Networks" [26240] or "Industrial Organisation" is helpful in any case but not considered a formal precondition. The english taught course "Communications Economics" is complementary and recommendet for anyone interested in the sector.

Below you will find excerpts from events related to this course:

V Telecommunication and Internet Economics

2561232, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
J.-J. Laffont, J. Tirole (2000): Competition in Telecommunications, MIT Press.

Zarnekow, Wulf, Bronstaedt (2013): Internetwirtschaft: Das Geschäft des Datentransports im Internet.

Weitere Literatur wird in den einzelnen Veranstaltungen angegeben

T 7.409 Course: Telecommunications Law [T-INFO-101309]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	1

Events					
SS 2020	24632	Telekommunikationsrecht	2 SWS	Lecture (V)	Hermstrüwer
Exams					
WS 19/20	7500049	Telecommunications Law		Prüfung (PR)	Barczak
SS 2020	7500085	Telecommunications Law		Prüfung (PR)	Eichenhofer

T 7.410 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	Recurrence	Version
Oral examination	3	Each term	1

Events					
SS 2020	6232807	Wettbewerb, Planung und Finanzierung im ÖPNV	2 SWS	Lecture (V)	Pischon

Competence Certificate
oral exam, appr. 20 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.411 Course: The negotiation of open innovation [T-WIWI-110867]

Responsible: Dr. Daniela Beyer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

Type	Credits	Recurrence	Version
Examination of another type	3	Once	1

Events					
SS 2020	2545105	Negotiating Open Innovation	2 SWS	Seminar (S)	Beyer
Exams					
SS 2020	7900017	Die Aushandlung von Open Innovation		Prüfung (PR)	Weissenberger-Eibl

Competence Certificate
Non exam assessment.

The following aspects are included in the evaluation:

- Exposé of the seminar paper (15%)
- Preparation of the methodology (15%) (interview guide, quantitative survey, etc.)
- informed participation and preparation of the simulation game (20%)
- written elaboration (50%).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

Below you will find excerpts from events related to this course:

V Negotiating Open Innovation

2545105, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
In times of great challenges, it is no longer sufficient for individual experts to be responsible for innovation success. This is precisely why there is currently so much hype surrounding the topic of Open Innovation. The exchange of knowledge within and between organizations is crucial, but requires the right attitudes and decisions. This seminar examines how this can be achieved in the best possible way, depending on the objectives. By visiting two practitioners from science-economics cooperations and the company's own Startup Accelerator Programme, theory and practice are linked. Furthermore, a simulation game will take place in the last session, in which the learned will be applied. The grading is based on a group seminar work, which requires an empirical analysis and the preparation of this in the course of the semester (expose, preparation of the methodology) as well as well-informed participation.

T 7.412 Course: Theory of Endogenous Growth [T-WIWI-102785]

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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2561503	Theory of endogenous growth	2 SWS	Lecture (V)	Ott
WS 19/20	2561504		1 SWS	Practice (Ü)	Ott, Eraydin

Competence Certificate
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.

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.

Annotation
Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

Below you will find excerpts from events related to this course:

V Theory of endogenous growth

2561503, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Lecture (V)

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 7.413 Course: Tires and Wheel Development for Passenger Cars [T-MACH-102207]

Responsible: Dr.-Ing. Günter Leister
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2114845	Tires and Wheel Development for Passenger Cars	2 SWS	Lecture (V)	Leister
Exams					
WS 19/20	76-T-MACH-102207	Tires and Wheel Development for Passenger Cars		Prüfung (PR)	Leister

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 2020, 2 SWS, Open in study portal **Lecture (V)**

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.

Literature
Manuskript zur Vorlesung

Manuscript to the lecture

T 7.414 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	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
SS 2020	2560232	Topics in Experimental Economics	2 SWS	Lecture (V)	Reiß
SS 2020	25602333	Übungen zu Topics in Experimental Economics	1 SWS	Practice (Ü)	Reiß
Exams					
WS 19/20	7900221	Topics in Experimental Economics		Prüfung (PR)	Reiß

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 7.415 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	Recurrence	Version
Written examination	3	Each term	1

Events					
WS 19/20	24136	Trademark and Unfair Competition Law	2 SWS	Lecture (V)	Matz
Exams					
WS 19/20	7500061	Trademark and Unfair Competition Law		Prüfung (PR)	Dreier, Matz
SS 2020	7500051	Trademark and Unfair Competition Law		Prüfung (PR)	Dreier, Matz

T 7.416 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	6232703	Straßenverkehrstechnik	2 SWS	Lecture / Practice (VÜ)	Vortisch, Mitarbeiter/innen
Exams					
WS 19/20	8240101798	Traffic Engineering		Prüfung (PR)	Vortisch

Prerequisites
None

Recommendation
None

Annotation
None

T 7.417 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6232804	Simulation von Verkehr	2 SWS	Lecture / Practice (VÜ)	Vortisch, Mitarbeiter/ innen
Exams					
WS 19/20	8240101800	Traffic Flow Simulation		Prüfung (PR)	Vortisch

Prerequisites
None

Recommendation
None

Annotation
None

T 7.418 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6232802	Verkehrsmanagement und Telematik	2 SWS	Lecture / Practice (VÜ)	Vortisch
Exams					
WS 19/20	8240101799	Traffic Management and Transport Telematics		Prüfung (PR)	Vortisch

Prerequisites
None

Recommendation
None

Annotation
None

T 7.419 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	Recurrence	Version
Written examination	4,5	Each summer term	1

Events					
SS 2020	2560230	Transport Economics	SWS	Lecture (V)	Mitusch, Szimba
SS 2020	2560231	Übung zu Transportökonomie	SWS	Practice (Ü)	Mitusch, Szimba, Wisotzky
Exams					
WS 19/20	7900293	Transport Economics		Prüfung (PR)	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 2020, SWS, Language: German, Open in study portal

Lecture (V)

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 7.420 Course: Transportation Data Analysis [T-BGU-100010]

Responsible: 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	6232901	Empirische Daten im Verkehrswesen	2 SWS	Lecture / Practice (VÜ)	Kagerbauer
Exams					
WS 19/20	8245100010	Transportation Data Analysis		Prüfung (PR)	Kagerbauer

Prerequisites
None

Recommendation
None

Annotation
None

T 7.421 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	6200406	Transportation Systems	2 SWS	Lecture (V)	Vortisch
Exams					
WS 19/20	8230106610	Transportation Systems		Prüfung (PR)	Vortisch

Prerequisites
None

Recommendation
None

Annotation
None

T 7.422 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	6241903	Tunnelbau und Sprengtechnik	2 SWS	Lecture (V)	Haghsheno, Scheuble, Matz
Exams					
WS 19/20	8240101846	Tunnel Construction and Blasting Engineering		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.423 Course: Turnkey Construction I - Processes and Methods [T-BGU-103430]

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	Recurrence	Version
Oral examination	1,5	Each summer term	1

Events					
SS 2020	6241808	Schlüsselfertiges Bauen I	1 SWS	Lecture (V)	Teizer
Exams					
WS 19/20	8240103430	Turnkey Construction I - Processes and Methods		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.424 Course: Turnkey Construction II - Trades and Technology [T-BGU-103431]

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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	6241809	Schlüsselfertiges Bauen II (Gewerke und Technik)	2 SWS	Lecture / Practice (VÜ)	Teizer, Denzer
Exams					
WS 19/20	8240103431	Turnkey Construction II - Trades and Technology		Prüfung (PR)	Haghsheno

Prerequisites
None

Recommendation
None

Annotation
None

T 7.425 Course: Urban Water Infrastructure and Management [T-BGU-106600]

Responsible: Dr.-Ing. Stephan Fuchs
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-104448 - Urban Water Technologies

Type	Credits	Recurrence	Version
Written examination	6	Each term	2

Events					
WS 19/20	6223701	Urban Water Infrastructure and Management	4 SWS	Lecture / Practice (VÜ)	Fuchs
Exams					
WS 19/20	8244106600	Urban Water Infrastructure and Management		Prüfung (PR)	Fuchs

Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none

T 7.426 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	Recurrence	Version
Written examination	4,5	Each winter term	1

Events					
WS 19/20	2530212	Valuation	2 SWS	Lecture (V)	Ruckes
WS 19/20	2530213	Übungen zu Valuation	1 SWS	Practice (Ü)	Ruckes, Stengel
Exams					
WS 19/20	7900057	Valuation		Prüfung (PR)	Ruckes

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Valuation
2530212, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Literature
Weiterführende Literatur
Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T 7.427 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	Recurrence	Version
Oral examination	3	Each winter term	1

Events					
WS 19/20	2113806	Vehicle Comfort and Acoustics I	2 SWS	Lecture (V)	Gauterin
SS 2020	2114856	Vehicle Ride Comfort & Acoustics I	2 SWS	Lecture (V)	Gauterin
Exams					
WS 19/20	76-T-MACH-105154	Vehicle Comfort and Acoustics I		Prüfung (PR)	Gauterin

Competence Certificate
Oral Examination

Duration: 30 up 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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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.

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 7.428 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	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2114825	Vehicle Comfort and Acoustics II	2 SWS	Lecture (V)	Gauterin
SS 2020	2114857	Vehicle Ride Comfort & Acoustics II	2 SWS	Lecture (V)	Gauterin
Exams					
WS 19/20	76-T-MACH-105155	Vehicle Comfort and Acoustics II		Prüfung (PR)	Gauterin

Competence Certificate
Oral Examination

Duration: 30 up 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 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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.

Literature
Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.

V

Vehicle Ride Comfort & Acoustics II

2114857, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

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.

Literature
Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.

The script will be supplied in the lectures.

T 7.429 Course: Vehicle Mechatronics I [T-MACH-105156]

Responsible: Prof. Dr.-Ing. Dieter Ammon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles
M-MACH-101265 - Vehicle Development

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Exams				
WS 19/20	76-T-MACH-105156	Vehicle Mechatronics I	Prüfung (PR)	Ammon

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

T 7.430 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	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2121352	Virtual Engineering I	2 SWS	Lecture (V)	Ovtcharova
WS 19/20	2121353	Exercises Virtual Engineering I	2 SWS	Practice (Ü)	Ovtcharova, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-102123	Virtual Engineering I		Prüfung (PR)	Ovtcharova

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 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

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 19/20, 2 SWS, Language: English, Open in study portal

Practice (Ü)

Content
The theoretical Konzepts and contents of the lecture will be trained within practical relevance by basic functionalities of VE System solutions.

Literature
Exercise script / Übungsskript

T 7.431 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	Recurrence	Version
Written examination	4	Each summer term	2

Events					
SS 2020	2122378	Virtual Engineering II	2/1 SWS	Lecture / Practice (VÜ)	Ovtcharova, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-102124	Virtual Engineering II		Prüfung (PR)	Ovtcharova

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 2020, 2/1 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)

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

Literature
Vorlesungsfolien / Lecture slides

T 7.432 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	Recurrence	Version
Examination of another type	4	Each term	1

Events					
WS 19/20	2123350	Virtual Engineering Lab	SWS	Project (PRO)	Ovtcharova, Mitarbeiter
SS 2020	2123350	Virtual Engineering Lab	3 SWS	Project (PRO)	Ovtcharova
Exams					
WS 19/20	76-T-MACH-106740	Virtual Engineering Lab		Prüfung (PR)	Ovtcharova

Competence Certificate
Assessment of another type (graded), procedure see webpage.

Below you will find excerpts from events related to this course:

V Virtual Engineering Lab

2123350, WS 19/20, SWS, Language: German/English, Open in study portal

Project (PRO)

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

Literature
Keine / None

V Virtual Engineering Lab

2123350, SS 2020, 3 SWS, Language: German/English, Open in study portal

Project (PRO)

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

Literature
Keine / None

T 7.433 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	Recurrence	Version
Examination of another type	4	Each term	1

Events					
WS 19/20	2123351	Virtual training factory 4.X	SWS		Ovtcharova, Mitarbeiter
SS 2020	2123351	Virtual training factory 4.X	SWS	Project (PRO)	Ovtcharova
Exams					
WS 19/20	76-T-MACH-106741	Virtual training factory 4.X		Prüfung (PR)	Ovtcharova

Competence Certificate
Assessment of another type (graded), procedure see webpage.

Below you will find excerpts from events related to this course:

V Virtual training factory 4.X

2123351, WS 19/20, SWS, Language: German, Open in study portal

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.

Literature
Keine / None

V Virtual training factory 4.X

2123351, SS 2020, SWS, Language: German, Open in study portal **Project (PRO)**

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.

Literature
Keine / None

T 7.434 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	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	2118097	Warehousing and distribution systems	2 SWS	Lecture (V)	Furmans

Competence Certificate
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

Prerequisites
none

Below you will find excerpts from events related to this course:

V Warehousing and distribution systems

2118097, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 7.435 Course: Wastewater and Storm Water Treatment Facilities for Industrial Engineers [T-BGU-109051]

Responsible: Dr.-Ing. Stephan Fuchs
Dr.-Ing. Tobias Morck

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: M-BGU-104448 - Urban Water Technologies

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	1

Events					
SS 2020	6223801	Wastewater and Storm Water Treatment Facilities	4 SWS	Lecture / Practice (VÜ)	Fuchs, Morck

Competence Certificate
report on field trips, appr. 8-15 pages

Prerequisites
none

Recommendation
none

Annotation
none

T 7.436 Course: Water Chemistry and Water Technology I [T-CIWVT-101900]

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	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	22621	Water Technology	2 SWS	Lecture (V)	Horn
WS 19/20	22622	Excersises to Water Technology	1 SWS	Practice (Ü)	Horn, und Mitarbeiter
WS 19/20	22664	Practical course: Water quality and water assessment	2 SWS	Practical course (P)	Horn, Abbt-Braun, und Mitarbeiter
Exams					
WS 19/20	7232001	Water Chemistry and Water Technology I		Prüfung (PR)	Horn, Abbt-Braun
SS 2020	7232001	Water Chemistry and Water Technology I		Prüfung (PR)	Horn, Abbt-Braun

Prerequisites
T-CIWVT-103351 - Wasserchemisches Praktikum must be passed.

T 7.437 Course: Water Chemistry and Water Technology II [T-CIWVT-101901]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101122 - Water Chemistry and Water Technology II

Type	Credits	Version
Oral examination	9	1

Events					
WS 19/20	22603	Scientific principles for water quality assessment	2 SWS	Lecture (V)	Abbt-Braun
SS 2020	22605	Membrane Technologies in Water Treatment	2 SWS	Lecture (V)	Horn, Saravia
Exams					
WS 19/20	7232003	Water Chemistry and Water Technology II		Prüfung (PR)	Horn, Abbt-Braun

Prerequisites
The module "Water Chemistry and Water Technology I" must be passed.

T 7.438 Course: Web Science [T-WIWI-103112]

Responsible: Prof. Dr. York Sure-Vetter
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	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511312	Web Science	2 SWS	Lecture (V)	Sure-Vetter
WS 19/20	2511313	Exercises to Web Science	1 SWS	Practice (Ü)	Sure-Vetter, Heling
Exams					
WS 19/20	7900031	Web Science		Prüfung (PR)	Sure-Vetter
SS 2020	7900032	Web Science (Registration until 13 July 2020)		Prüfung (PR)	Sure-Vetter

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 Web Science

2511312, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The lecture provides insights into the analysis of social networks and the used metrics. Thereby, in particular, web phenomena and the available technologies are considered.

Web Science is the emergent study of the people and technologies, applications, processes and practices that shape and are shaped by the World Wide Web. Web Science aims to draw together theories, methods and findings from across academic disciplines, and to collaborate with industry, business, government and civil society, to develop our knowledge and understanding of the Web: the largest socio-technical infrastructure in human history.

The lecture provides an introduction to basic concepts of Web Science. Essential theoretical foundations, phenomena and approaches are presented and explained.

This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Learning objectives:

The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.

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

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World, by David Easley and Jon Kleinberg, 2010 (free online book: http://www.cs.cornell.edu/home/kleinber/networks-book/)
- Thelwall, M. (2009). Social network sites: Users and uses. In: M. Zelkowitz (Ed.), Advances in Computers 76. Amsterdam: Elsevier (pp. 19-73)

V Exercises to Web Science

2511313, WS 19/20, 1 SWS, Language: English, Open in study portal

Practice (Ü)

Content
The exercises are related to the lecture Web Science.

Multiple exercises are held that capture the topics, held in the lecture Web Scienceand discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Learning objectives:

The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.

Literature

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World, by David Easley and Jon Kleinberg, 2010 (free online book: http://www.cs.cornell.edu/home/kleinber/networks-book/)
- Thelwall, M. (2009). Social network sites: Users and uses. In: M. Zelkowitz (Ed.), Advances in Computers 76. Amsterdam: Elsevier (pp. 19-73)

T 7.439 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	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2173571	Welding Technology	2 SWS	Lecture (V)	Farajian
Exams					
WS 19/20	76-T-MACH-105170	Welding Technology		Prüfung (PR)	Farajian

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

2173571, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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

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 7.440 Course: Wildcard Key Competences Seminar 1 [T-WIWI-104680]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Completed coursework	1	1

T 7.441 Course: Wildcard Key Competences Seminar 2 [T-WIWI-104681]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Completed coursework	2	1

T 7.442 Course: Wildcard Key Competences Seminar 3 [T-WIWI-104682]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Completed coursework	3	1

T 7.443 Course: Wildcard Key Competences Seminar 4 [T-WIWI-104683]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Examination of another type	1	1

T 7.444 Course: Wildcard Key Competences Seminar 5 [T-WIWI-104684]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Examination of another type	2	1

T 7.445 Course: Wildcard Key Competences Seminar 6 [T-WIWI-104685]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Examination of another type	3	1

T 7.446 Course: Wildcard Key Competences Seminar 8 [T-WIWI-105956]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Version
Examination of another type	4	1

T 7.447 Course: Wildcard Seminar Module Master [T-WIWI-110215]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type	Credits	Recurrence	Version
Examination of another type	3	see Annotations	1

T 7.448 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
WS 19/20	2577922	Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)	2 SWS	Seminar (S)	Lindstädt
Exams					
WS 19/20	7900172	Workshop Business Wargaming – Analyzing Strategic Interactions		Prüfung (PR)	Lindstädt

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) — Seminar (S)

2577922, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

Learning Objectives:

Students

- are able to analyze business strategies and derive recommendations for the management
- learn to express their position through compelling reasoning in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

T 7.449 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	Recurrence	Version
Examination of another type	3	Irregular	1

Events					
SS 2020	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar (S)	Lindstädt

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)

2577923, SS 2020, 2 SWS, Language: German, Open in study portal

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:

Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:

Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

Assessment:

The assessment of performance is made through active participation in the discussion rounds; adequate preparation is expressed here and a clear understanding of the topic and framework becomes evident. Further details on the design of the success control will be announced during the lecture.

Note:

This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

T 7.450 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	Recurrence	Version
Oral examination	4	Each term	1

Events					
WS 19/20	2141007	X-ray Optics	2 SWS	Lecture (V)	Last
SS 2020	2141007	X-ray optics	2 SWS	Lecture (V)	Last
Exams					
WS 19/20	76-T-MACH-109122	X-ray Optics		Prüfung (PR)	Last
SS 2020	76-T-MACH-109122	X-ray Optics		Prüfung (PR)	Last

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 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

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 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
see Institute homepage

If you are interested, please contact arndt.last@kit.edu by 24.4.2020 to make an appointment.