Karlsruher Institut für Technologie

Module Handbook
Industrial Engineering and Management B.Sc.

SPO 2015

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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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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
Telefon +49 721 608-43768
E-Mail: pruefungssekretariat@wiwi.kit.edu

Editorial responsibility:

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Email: modul@wiwi.kit.edu \

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 Bachelor's degree program in Industrial Engineering and Management

4.1 Qualification objectives of the Bachelor's degree in Industrial Engineering and Management

Graduates of the Bachelor's degree in Industrial Engineering and Management are equipped with strategically oriented knowledge in economics, engineering sciences, mathematics and information technology acquired during the three-semester core program.

The economics section includes business-related topics from the financial industry, company management, information industry, production management, marketing and accounting as well as economic correlations of microeconomics and macroeconomics.

The math section is divided into mathematics, statistics and operations research. It includes analysis and linear algebra, descriptive and inductive statistics, elementary probability theory and optimization methods.

In the engineering field, the focus is on material and energy balances, material characterization and development, engineering mechanics and electrical engineering.

The technological area is covered by the Applied and Theoretical Computer Science. Through the comprehensive methodological basis, the graduates are in a position to acknowledge and apply specialized basic concepts, methods, models and approaches. They are also able to analyze and review economic and technological structures and processes.

Graduates can independently solve basic engineering calculations and are able to apply important mathematical concepts and methods to solve concrete tasks.

The graduates have deeper knowledge in business administration, economics, computer science, operations research and engineering. Specialization is either done in the field of business administration or engineering depending on one's wishes. Additional knowledge in statistics, law or sociology is also offered depending on one's interests. They are able to react based on this knowledge from the different subjects and disciplines. They thereby largely operate independently in economic, technical and technological topics and survey, analyze, interpret and evaluate the situations systematically.

They are able to classify specialized problems as well as model and choose appropriate methods and procedures for solving the given tasks as well as derive improvement potentials. They know how to validate, illustrate and interpret the achieved results.

This practical use of their know-how also takes into account the social, scientific and ethical aspects.

Graduates of the Bachelor's degree in Industrial Engineering and Management master the basics of project management and are able to assume responsibility in interdisciplinary teams. They are in a position to argue and defend their position both before expert representatives and laypersons.

They have the ability to apply the acquired information on career-related activities in the industry, service sector or in the public management as well as take up a Master's degree program in Industrial Engineering and Management or any other related course.

4.2 Structure of the Bachelor's degree program in Industrial Engineering and Management SPO 2015

The Bachelor's degree program in Industrial Engineering and Management entails a six-semester standard study period. The basic program in the first three semesters is systematically structured. In the fourth to fifth semesters, a more advanced, specialization program that can be structured depending on one's personal interests and goals is offered.

Figure 2 shows the course and module structure with the respective credit points as well as an example of a possible distribution of modules and courses in the basic program over the semesters, which has proven to be useful.

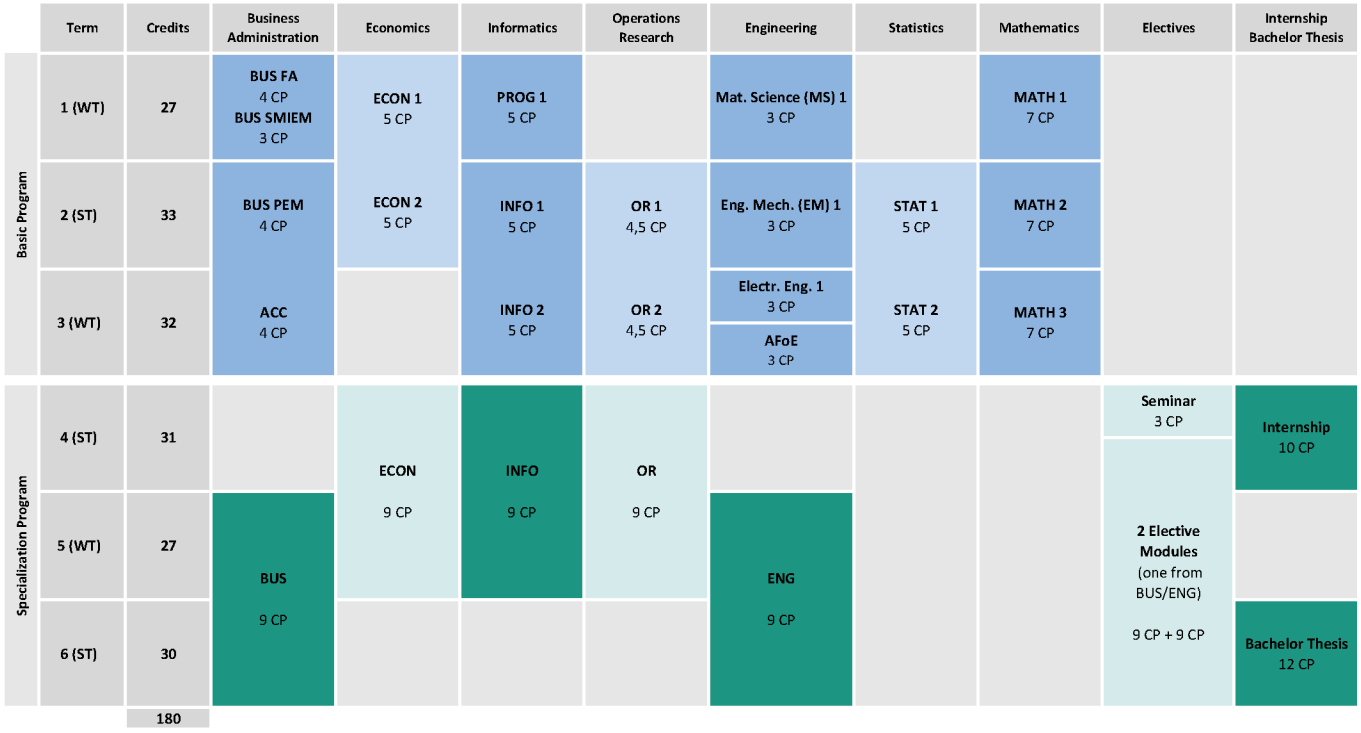

Figure 2: Structure of the Bachelor's degree program in Industrial Engineering and Management SPO 2015 (recommended)

In the **basic program** (blue), the business administration, economics, informatics, operations research, engineering sciences, statistics and mathematics modules are compulsory. In the 3rd semester, one can choose between Material Transformation and Balances, Engineering Mechanics and Material Science in the engineering basic module.

In the **specialization program** (green), a module must be selected from each of the following areas: business administration, economics, informatics, operations research and engineering. As part of the mandatory courses, one seminar module (independent of the course) and two modules must be completed. One module can be selected from business administration or engineering subjects and the other from business administration, economics, informatics, operations research, engineering, statistics, law or sociology.

The **internship** can be completed before or during the Bachelor's program. The performance record of the completed internship is required for registration for the final module examination in the course.

One is free to structure his/her individual course plan as he/she wishes (taking into account the respective provisions of the study and examination regulations as well as applicable module regulations) and choose the semester he/she wishes to start and/or complete the selected modules. It is however strongly recommended to adhere to the proposal for the first three semesters. The content of the courses is interdisciplinary and coordinated accordingly; the intersection freedom of lectures and examination dates is guaranteed for the recommended study semester.

All modules of the basic and advanced program, including the various alternatives within the module, can be found in this module handbook. Seminars that can be taken up as part of the seminar module are published at the WiWi portal at https://portal.wiwi.kit.edu/Seminare.

4.3 Key Skills

The Bachelor's degree course in Industrial Engineering and Management at the 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. 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 compulsory courses during the bachelor programme, namely

- Basic programme in economics and business science
- Seminar module
- Mentoring of the bachelor thesis
- Internship
- Business science, economics and informatics modules

5 Field of study structure

Mandatory	
Bachelor Thesis	12 CR
Internship	10 CR
Business Administration	24 CR
Economics	19 CR
Informatics	24 CR
Operations Research	18 CR
Engineering Sciences	21 CR
Mathematics	21 CR
Statistics	10 CR
Compulsory Elective Modules	21 CR

5.1 Bachelor Thesis

Credits
12

Mandatory		
M-WIWI-101601	Module Bachelor Thesis	12 CR

5.2 Internship

Credits
10

Mandatory		
M-WIWI-101419	Internship	10 CR

5.3 Business Administration

Credits 24

Mandatory		
M-WIWI-101494	Fundamentals of Business Administration 1	7 CR
M-WIWI-101578	Fundamentals of Business Administration 2	8 CR
Election block: Specialisation Program Business Administration (at least 9 credits)		
M-WIWI-101467	Design, Construction and Sustainability Assessment of Buildings	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-105035	Empirical Finance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-104911	Information Systems & Digital Business: Interaction	9 CR
M-WIWI-104912	Information Systems & Digital Business: Platforms	9 CR
M-WIWI-104913	Information Systems & Digital Business: Servitization	9 CR
M-WIWI-101513	Human Resources and Organizations	9 CR
M-WIWI-101466	Real Estate Management	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR

5.4 Economics

Credits 19

Mandatory		
M-WIWI-101398	Introduction to Economics	10 CR
Election block: Specialisation Program Economics (at least 9 credits)		
M-WIWI-101499	Applied Microeconomics	9 CR
M-WIWI-101403	Public Finance	9 CR
M-WIWI-101599	Statistics and Econometrics	9 CR
M-WIWI-101668	Economic Policy I	9 CR
M-WIWI-101501	Economic Theory	9 CR

5.5 Informatics

Credits 24

Mandatory		
M-WIWI-101417	Foundations of Informatics	10 CR
M-WIWI-101581	Introduction to Programming	5 CR
Election block: Specialisation Program Informatics (at least 9 credits)		
M-WIWI-105112	Applied Informatics	9 CR

5.6 Operations Research

Credits
18

Mandatory		
M-WIWI-101418	Introduction to Operations Research	9 CR
Election block: Specialisation Program Operations Research (1 item)		
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-103278	Optimization under Uncertainty	9 CR

5.7 Engineering Sciences

Credits
21

Mandatory		
M-ETIT-101155	Electrical Engineering	3 CR
M-MACH-101259	Engineering Mechanics	3 CR
M-WIWI-101839	Additional Fundamentals of Engineering	3 CR
M-MACH-101260	Materials Science	3 CR
Election block: Specialisation Program Engineering Sciences (at least 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-102379	Power Network	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-BGU-101004	Fundamentals of Construction	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management neu	9 CR
M-MACH-101299	Mechanical Design	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-101270	Product Lifecycle Management	9 CR
M-ETIT-101156	Control Engineering	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-MACH-101284	Specialization in Production Engineering	9 CR
M-MACH-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR

5.8 Mathematics

Credits
21

Mandatory		
M-MATH-101676	Mathematics 1	7 CR
M-MATH-101677	Mathematics 2	7 CR
M-MATH-101679	Mathematics 3	7 CR

5.9 Statistics

Credits
10

Mandatory		
M-WIWI-101432	Introduction to Statistics	10 CR

5.10 Compulsory Elective Modules

Credits
21

Election notes
Within the scope of the elective compulsory area, the seminar module (independent of subject) and two modules are to be taken. One module must be chosen from the subjects Business Administration or Engineering Sciences, the other from the subjects Business Administration, Economics, Informatics, Operations Research, Engineering Sciences, Statistics, Law or Sociology.

Election regulations
Elections in this field must be complete.

Mandatory		
M-WIWI-101816	Seminar Module	3 CR
Election block: Business Administration oder Engineering Sciences (9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-101467	Design, Construction and Sustainability Assessment of Buildings	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101460	CRM and Service Management	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-102379	Power Network	9 CR
M-WIWI-105035	Empirical Finance	9 CR
M-ETIT-101165	Energy Generation and Network Components	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	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-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-BGU-101004	Fundamentals of Construction	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-104911	Information Systems & Digital Business: Interaction	9 CR
M-WIWI-104912	Information Systems & Digital Business: Platforms	9 CR
M-WIWI-104913	Information Systems & Digital Business: Servitization	9 CR
M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management neu	9 CR
M-MACH-101299	Mechanical Design	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-WIWI-101513	Human Resources and Organizations	9 CR
M-MACH-101270	Product Lifecycle Management	9 CR
M-WIWI-101466	Real Estate Management	9 CR
M-ETIT-101156	Control Engineering	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101421	Supply Chain Management	9 CR
M-MACH-101279	Technical Logistics	9 CR

M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
M-WIWI-101422	Specialization in Customer Relationship Management	9 CR
M-MACH-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-MACH-101284	Specialization in Production Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Election block: Business Administration (at most 9 credits)		
M-WIWI-101467	Design, Construction and Sustainability Assessment of Buildings	9 CR
M-WIWI-101498	Management Accounting	9 CR
M-WIWI-101434	eBusiness and Service Management	9 CR
M-WIWI-101402	eFinance	9 CR
M-WIWI-105035	Empirical Finance	9 CR
M-WIWI-101464	Energy Economics	9 CR
M-WIWI-101435	Essentials of Finance	9 CR
M-WIWI-102752	Fundamentals of Digital Service Systems	9 CR
M-WIWI-101424	Foundations of Marketing	9 CR
M-WIWI-101437	Industrial Production I	9 CR
M-WIWI-104911	Information Systems & Digital Business: Interaction	9 CR
M-WIWI-104912	Information Systems & Digital Business: Platforms	9 CR
M-WIWI-104913	Information Systems & Digital Business: Servitization	9 CR
M-WIWI-101513	Human Resources and Organizations	9 CR
M-WIWI-101466	Real Estate Management	9 CR
M-WIWI-101425	Strategy and Organization	9 CR
M-WIWI-101421	Supply Chain Management	9 CR
M-WIWI-101465	Topics in Finance I	9 CR
M-WIWI-101423	Topics in Finance II	9 CR
Election block: Economics (at most 9 credits)		
M-WIWI-101499	Applied Microeconomics	9 CR
M-WIWI-101403	Public Finance	9 CR
M-WIWI-101599	Statistics and Econometrics	9 CR
M-WIWI-101668	Economic Policy I	9 CR
M-WIWI-101501	Economic Theory	9 CR
Election block: Informatics (at most 9 credits)		
M-WIWI-101426	Electives in Informatics	9 CR
Election block: Operations Research (at most 9 credits)		
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-103278	Optimization under Uncertainty	9 CR
Election block: Engineering Sciences (at most 9 credits)		
M-WIWI-101404	Extracurricular Module in Engineering	9 CR
M-MACH-101274	Rail System Technology	9 CR
M-WIWI-104838	Introduction to Natural Hazards and Risk Analysis	9 CR
M-ETIT-102379	Power Network	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-BGU-101004	Fundamentals of Construction	9 CR

M-MACH-101272	Integrated Production Planning	9 CR
M-MACH-105298	Logistics and Supply Chain Management neu	9 CR
M-MACH-101299	Mechanical Design	9 CR
M-MACH-101277	Material Flow in Logistic Systems	9 CR
M-MACH-101287	Microsystem Technology	9 CR
M-MACH-101267	Mobile Machines	9 CR
M-BGU-101067	Mobility and Infrastructure	9 CR
M-MACH-101270	Product Lifecycle Management	9 CR
M-ETIT-101156	Control Engineering	9 CR
M-MACH-101279	Technical Logistics	9 CR
M-MACH-101275	Combustion Engines I	9 CR
M-MACH-101303	Combustion Engines II	9 CR
M-MACH-101284	Specialization in Production Engineering	9 CR
M-MACH-101261	Emphasis in Fundamentals of Engineering	9 CR
M-MACH-101262	Emphasis Materials Science	9 CR
M-MACH-101286	Machine Tools and Industrial Handling	9 CR
Election block: Statistics (at most 9 credits)		
M-WIWI-101599	Statistics and Econometrics	9 CR
Election block: Law or Sociology (at most 9 credits)		
M-INFO-105084	Public and Civil Law	9 CR
M-GEISTSOZ-101167	Sociology/Empirical Social Research	9 CR

6 Modules

M 6.1 Module: Additional Fundamentals of Engineering [M-WIWI-101839]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Dr. Volker Gaukel
Prof. Dr. Michael Hoffmann

Organisation: KIT Department of Economics and Management

Part of: Engineering Sciences (mandatory)

Credits	Recurrence	Language	Level	Version
3	Each term	German	3	4

Election block: Compulsory Elective Courses (between 3 and 5 credits)			
T-MACH-102079	Material Science II for Business Engineers	5 CR	Hoffmann
T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics	5 CR	Fidlin
T-CIWVT-106058	Process Fundamentals by the Example of Food Production	3 CR	Gaukel
T-ETIT-100534	Electrical Engineering for Business Engineers, Part II	5 CR	Menesklou

Competence Certificate
See course description.

Competence Goal
See German version.

Prerequisites
None

Content
The module focuses on basic engineering topics related to materials science, engineering mechanics and food processing.

Annotation
ThecourseT-ETIT-100534 "Electrical Engineering for Business Engineers, Part II" is only offered temporarily in the module.

It should be pointed out that "Material Science II for Business Engineers" and "Electrical Engineering for Business Engineers, Part II" are not offered in winter term, but only in summer term.

Workload
The total workload for this module is approximately 90 hours.

M 6.2 Module: Applications of Operations Research [M-WIWI-101413]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Operations Research (Specialisation Program Operations Research)
Compulsory Elective Modules (Operations Research)

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

Election block: Compulsory Elective Courses (between 1 and 2 items)			
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel
Election block: Supplementary Courses (at most 1 item)			
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-106199	Modeling and OR-Software: Introduction	4,5 CR	Nickel
T-WIWI-106545	Optimization under Uncertainty	4,5 CR	Rebennack

Competence Certificate
Due to a research semester of Professor Nickel in WS 19/20, the events 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 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 Supply Chain Management and their respective optimization problems,
- is acquainted with classical location problem models (in the plane, on 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*Facility Location and strategic Supply Chain Management*and*Tactical and operational Supply Chain Management*has to be taken.

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 Supply Chain Management. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities like 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 Management, 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
The courses Introduction to Operations Research I and II are helpful.

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

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.3 Module: Applied Informatics [M-WIWI-105112]

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. Ali Sunyaev
Prof. Dr. York Sure-Vetter
Prof. Dr. Melanie Volkamer

Organisation: KIT Department of Economics and Management

Part of: Informatics (Specialisation Program Informatics)

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	3	1

Election block: Advanced Programming (1 item)			
T-WIWI-102747	Advanced Programming - Java Network Programming	4,5 CR	Ratz, Zöllner
T-WIWI-102748	Advanced Programming - Application of Business Software	4,5 CR	Klink, Oberweis
Election block: Compulsory Elective Area (1 item)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	Sure-Vetter
T-WIWI-110341	Applied Informatics – Database Systems	4,5 CR	Oberweis
T-WIWI-110342	Applied Informatics – Information Security	4,5 CR	Volkamer
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-110338	Applied Informatics – Modelling	4,5 CR	Oberweis, Sure-Vetter
T-WIWI-110343	Applied Informatics – Software Engineering	4,5 CR	Oberweis

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

- Partial exam I: *Advanced Programming - Java Network Programming* or alternativly *Advanced Programming - Application of Business Software*
- Partial exam II: all the rest

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.

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 capability of dealing with the practical application of the Java programming language (which is the dominating programming language in many application areas) or alternatively the ability to configure, parameterize and deploy enterprise software to enable, support and automate business processes,
- knows in depth methods and systems of a core area or a core application area of Informatics according to the contents dealt with in the lectures,
- can choose these methods and system situation adequately and can furthermore design and employ them for problem solving,
- is able to independently find strategic and creative answers in the finding of solutions to well defined, concrete, and abstract problems.

Content
In this module, object-oriented programming skills using the Java programming language are further deepened. Alternatively important fundamentals of business information systems are conveyed that enable, support and accelerate new forms of business processes and organizational forms. Based on a core application area, basic methods and techniques of computer science are presented.

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

M 6.4 Module: Applied Microeconomics [M-WIWI-101499]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	3

Election block: Compulsory Elective Courses (at least 9 credits)			
T-WIWI-102876	Auction & Mechanism Design	4,5 CR	Szech
T-WIWI-102892	Economics and Behavior	4,5 CR	Szech
T-WIWI-102850	Introduction to Game Theory	4,5 CR	Puppe, Reiß
T-WIWI-102792	Decision Theory	4,5 CR	Ehrhart
T-WIWI-102844	Industrial Organization	4,5 CR	Reiß
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-102736	Economics III: Introduction in Econometrics	5 CR	Schienle
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

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

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

Competence Goal
Students

- are introduced to the basic theoretical analysis of strategic interaction situations and shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings, (course "Introduction to Game Theory");
- are exposed to the basic problems of imperfect competition and its implications for policy making; (course "Industrial Organization");
- are provided with the basic economics of network industries (e.g., telecom, utilities, IT, and transport sectors) and should get a vivid idea of the special characteristics of network industries concerning planning, competition, competitive distortion, and state intervention, (course "Competition in Networks").

Prerequisites
None.

Content
The module's purpose is to extend and foster skills in microeconomic theory by investigating a variety of applications. Students shall be able to analyze real-life problems using microeconomics.

Recommendation
Completion of the module Economics is assumed.

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

M 6.5 Module: Automotive Engineering [M-MACH-101266]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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 6.6 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 (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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 6.7 Module: Combustion Engines II [M-MACH-101303]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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
It is only possible to choose this module in combination with the module *Combustion Engines I*. The module is passed only after the final partial exam of *Combustion Engines I* is additionally passed.

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

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 6.8 Module: Control Engineering [M-ETIT-101156]

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

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

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

Mandatory			
T-ETIT-100699	Modelling and Identification	4 CR	Hohmann
T-ETIT-101921	System Dynamics and Control Engineering	6 CR	Hohmann

Competence Goal
The students

- get familiar with the basic concepts of control theory,
- learn and understand the elements, the structure and the behavior of dynamic systems,
- have insight in the problems of control and intuition about methods available to solve those problems as well in frequency domain as in time domain,
- get familiar with the basic principles and methods for the theoretical and experimental modelling of dynamic systems.

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

Content
This module familiarizes students with the basic elements, structures and the behavior of dynamic systems. Both time continuous and time discrete models are regarded. The students gain insight into the problems of control design and methods available to solve such problems in frequency and time domain. Above that, the students learn the basic principles and methods for the theoretical and experimental modelling of dynamic systems.

M 6.9 Module: CRM and Service Management [M-WIWI-101460]

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

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

Election block: Compulsory Elective Courses (2 items)			
T-WIWI-102596	Analytical CRM	4,5 CR	Geyer-Schulz
T-WIWI-102595	Customer Relationship Management	4,5 CR	Geyer-Schulz
T-WIWI-102597	Operative CRM	4,5 CR	Geyer-Schulz

Competence Certificate
This module will be offered for the last time in winter semester 2019/20.

The assessment is carried out as partial exams (according to § 4 (1) S. 2 2nd clause 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 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 service management as the managerial foundation of customer relationship management and the resulting implications for strategic management, the organisational structure, and the functional areas of the comapany,
- develops and designs service concepts and service systems on a conceptual level,
- works in teams on case studies and respects project dates, integrates international literature of the discipline,
- knows the current developments in CRM in science as well as in industry,
- knows the scientific methods (from business administration, statistics, informatics) which are most relevant for analytic CRM and he autonomously applies these methods to standard cases,
- designs, implements, and analyzes operative CRM processes in concrete application domains (e.g. campaign management, call center management, ...).

Prerequisites
None

Content
In the module CRM and Service Management we teach the principles of modern customer-oriented management and its support by system architectures and CRM software packages. Choosing customer relationship management as a company's strategy requires service management and a strict implementation of service management in all parts of the company.

For operative CRM we present the design of customer-oriented, IT-supported business processes based on business process modelling and we explain these processes in concrete application scenarios (e.g. marketing campaign management, call center management, sales force management, field services, ...).

Analytic CRM is dedicated to improve the use of knowledge about customers in the broadest sense for decision-making (e.g. product-mix decisions, bonus programs based on customer loyality, ...) and for the improvement of services. A requirement for this is the tight integration of operative systems with a data warehouse, the development of customer-oriented and flexible reporting systems, and – last but not least – the application of statistical methods (clustering, regression, stochastic models, ...).

Annotation
The lecture *Customer Relationship Management* [2540508] is given in English.

Workload
The total amount of work for this module is approximately 270 hours (9 credits). The subdivision is based on the credits of the courses of the module.
The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam periods and the time that is required to achieve the objectives of the module as an average student with an average performance.

M 6.10 Module: Design, Construction and Sustainability Assessment of Buildings [M-WIWI-101467]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

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

Mandatory			
T-WIWI-102742	Design, Construction and Sustainability Assessment of Buildings I	4,5 CR	Lützkendorf
T-WIWI-102743	Design, Construction and Sustainability Assessment of Buildings II	4,5 CR	Lützkendorf

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

- knows the basics of sustainable design, construction and operation of buildings with an emphasis on building ecology
- has knowledge of building ecology assessment procedures and tools for design and assessment
- is capable of applying this knowledge to assessing the ecological advantageousness of buildings as well as their contribution to a sustainable development.

Prerequisites
None

Content
Sustainable design, construction and operation of buildings currently are predominant topics of the real estate sector, as well as "green buildings". Not only designers and civil engineers, but also other actors who are concerned with project development, financing and insurance of buildings or portfolio management are interested in these topics.

On the one hand the courses included in this module cover the basics of energy-efficient, resource-saving and health-supporting design and construction of buildings. On the other hand fundamental assessment procedures for analysing and communicating the ecological advantageousness of technical solutions are discussed. With the basics of green building certification systems the lectures provide presently strongly demanded knowledge.

Additionally, videos and simulation tools are used for providing a better understanding of the content of teaching.

Recommendation
The combination with the module *Real Estate Management*is recommended.

Furthermore a combination with courses in the area of

- Industrial production (energy flow in the economy, energy politics, emissions)
- Civil engineering and architecture (building physics, building construction)

is recommended.

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

M 6.11 Module: eBusiness and Service Management [M-WIWI-101434]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	9

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-109938	Digital Services	4,5 CR	Satzger, Weinhardt
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-109936	Platform Economy	4,5 CR	Dorner, 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 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 strategic and operative design of information and information products,
- analyze the role of information on markets,
- evaluate case studies regarding information products,
- develop solutions in teams.

Prerequisites
None

Content
This module gives an overview of the mutual dependencies of strategic management and information systems. The central role of information is exemplified by the structuring concept of the information life cycle.

The single phases of this life cycle from generation over allocation until dissemination and use of the information are analyzed from a business and microeconomic perspective, applying classical and new theories. The state of the art of economic theory on aspects of the information life cycle are presented. The lecture is complemented by exercise courses. The courses "Platform Economy", "eFinance: Information systems in finance" and "eServices" constitute three different application domains in which the basic principles of the Internet Economy are deepened. In the core lecture "Platform Economy" the focus is set on markets between two parties that act through an intermediary on an Internet platform. Topics discussed are network effects, peer-to-peer markets, blockchains and marketdesign. The course is held in English and teaches parts of the syllabus with the support of a case study in which students analyze a platform.

The course "eFinance: information systems for securities trading" provides theoretically profound and also practical-oriented background about the functioning of international financial markets. The focus is placed on the economic and technical design of markets as information processing systems.

In "eServices" the increasing impact of electronic services compared to the traditional services is outlined. The Information- und Communication Technologies enable the provision of services, which are mainly characterized by interactivity and individuality. This course provides basic knowledge about the development and management of ICT-based servies.

The theoretic fundamentals of Information systems can be enriched by a practical experience in Special Topics in Information Engineering and Management. Any practical Seminar at the IM can be chosen for the course Special Topics in Information systems.

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 of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.12 Module: Economic Policy I [M-WIWI-101668]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	9

Mandatory			
T-WIWI-103213	Basic Principles of Economic Policy	4,5 CR	Ott
Election block: Compulsory Elective Courses (1 item)			
T-WIWI-109121	Macroeconomic Theory	4,5 CR	Brumm
T-WIWI-102739	Public Revenues	4,5 CR	Wigger
T-WIWI-102908	Personnel Policies and Labor Market Institutions	4,5 CR	Nieken
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

Competence Certificate
The module examination takes place in the form of examinations (§4(2),1 SPO) of the selected partial module performance. The examination is carried out separately for each partial module and is described there. It is possible to repeat examinations at any regular examination date.

The grades of the partial module correspond to the grades of the passed examinations. The overall grade of the module is formed from the grades of the partial performances weighted with LP.

Competence Goal
Students shall be given the ability to

- understand and deepen basic concepts of micro- and macroeconomic theories
- apply those theories to economic policy issues
- understand government interventions in the market and their legitimation from the perspective of economic welfare
- learn how theory-based policy recommendations are derived

Prerequisites
The course "Introduction to Economic Policy" is mandatory in the module.

Content

- Intervention in the market: micro-economic perspective
- Intervention in the market: macroeconomic perspective
- Institutional economic aspects
- Economic policy and welfare economics
- Carriers of economic policy: political-economic aspects

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2610012], and Economics II [2600014].

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

M 6.13 Module: Economic Theory [M-WIWI-101501]

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

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

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory	4,5 CR	Mitusch
T-WIWI-102876	Auction & Mechanism Design	4,5 CR	Szech
T-WIWI-102892	Economics and Behavior	4,5 CR	Szech
T-WIWI-102850	Introduction to Game Theory	4,5 CR	Puppe, Reiß
T-WIWI-102844	Industrial Organization	4,5 CR	Reiß
T-WIWI-109121	Macroeconomic Theory	4,5 CR	Brumm
T-WIWI-102610	Welfare Economics	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 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
The lecture Introduction to Game Theory focuses on the basics of non-cooperative game theory. Model assumptions, solution concepts and applications are discussed in detail both for simultaneous games (normal form games) and for sequential games (extensive form games). Classical equilibrium concepts like the Nash equilibrium or the subgame perfect equilibrium, but also advanced concepts will be discussed in detail. If necessary, a brief insight into cooperative game theory will also be given.

The course Auction & Mechanism Design starts with the basic theory of equilibrium behavior and yield management in single object standard auctions. After introducing the yield equivalence theorem for standard auctions, the focus shifts to mechanism design and its applications for single-object auctions and bilateral exchanges.

The course Economics and Behavior introduces fundamental topics of behavioural economics in terms of content and methodology. Students will also gain insight into the design of economic experimental studies. Students will also be introduced to the reading of and critical examination of current research in behavioural economics.

Recommendation
None

Annotation
The course T-WIWI-102609 - Advanced Topics in Economic Theory is currently not available.

M 6.14 Module: eFinance [M-WIWI-101402]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	German/English	3	8

Mandatory			
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
Election block: Supplementary Courses (at least 4,5 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg

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

- are able to understand and analyse the value creation chain in stock broking,
- are able to adequatly identify, design and use methods and systems to solve problems in finance,
- are able to evaluate and criticize investment decisions by traders,
- are able to apply theoretical methods of econometrics,
- learn to elaborate solutions in a team.

Prerequisites
The course *eFinance: Information Systems for Securities Trading* [2540454] is compulsory and must be examined.

Content
The module "eFinance: Information engineering and management in finance" addresses current problems in the finance sector. It is investigated the role of information and knowledge in the finance sector and how information systems can solve or extenuate them. Speakers from practice will contribute to lectures with their broad knowledge. Core courses of the module deal with the background of banks and insurance companies and the electronic commerce of stocks in global finance markets. In addtion the course Derivatives offers an insight into future and forward contracts as well as the assesment of options. Exchanges and International Finance are also alternatives which provide a suplementary understanding for capital markets.

Information management topics are in the focus of the lecture "eFinance: information engineering and management for securities trading". For the functioning of the international finance markets, it is necessary that there is an efficient information flow. Also, the regulatory frameworks play an important role. In this context, the role and the functioning of (electronic) stock markets, online brokers and other finance intermediaries and their platforms are presented. Not only IT concepts of German finance intermediaries are presented, but also international system approaches will be compared. The lecture is supplemented by speakers from the practice (and excursions, if possible) coming from the Deutsche Börse and the Stuttgart Stock Exchange.

Annotation
The current seminar courses for this semester, which are complementary to this module, are listed on following webpage: the http://www.iism.kit.edu/im/lehre

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.15 Module: Electives in Informatics [M-WIWI-101426]

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. Ali Sunyaev
Prof. Dr. York Sure-Vetter
Prof. Dr. Melanie Volkamer

Organisation: KIT Department of Economics and Management

Part of: Compulsory Elective Modules (Informatics)

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	3	11

Election block: Compulsory Elective Area (between 1 and 2 items)			
T-WIWI-110340	Applied Informatics – Applications of Artificial Intelligence	4,5 CR	Sure-Vetter
T-WIWI-110341	Applied Informatics – Database Systems	4,5 CR	Oberweis
T-WIWI-110342	Applied Informatics – Information Security	4,5 CR	Volkamer
T-WIWI-110339	Applied Informatics – Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	4,5 CR	Sunyaev
T-WIWI-110338	Applied Informatics – Modelling	4,5 CR	Oberweis, Sure-Vetter
T-WIWI-110343	Applied Informatics – Software Engineering	4,5 CR	Oberweis
T-WIWI-110711	Supplement Applied Informatics	4,5 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-104679	Foundations of Mobile Business	4,5 CR	Oberweis
Election block: Advanced Labs (at most 1 item)			
T-WIWI-110541	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

Competence Certificate
The assessment is carried out as two 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

- knows and has mastered methods and systems for core topics and core application areas of computer science,
- can choose these methods and system situation adequately and can furthermore design and employ them for problem solving,
- is able to independently find strategic and creative answers in the finding of solutions to well defined, concrete, and abstract problems.

Prerequisites
None

Content
The elective module conveys advanced knowledge in the area of applied computer science. This includes, for example, the efficient design and optimization of technical systems, the design and management of database applications or the systematic development of large software systems. Moreover, modeling of complex systems, the use of computer science methods to support knowledge management, and the design and implementation of service-oriented architectures are discussed in this module.

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

M 6.16 Module: Electrical Engineering [M-ETIT-101155]

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

Credits	Recurrence	Duration	Level	Version
3	Each winter term	1 semester	3	1

Mandatory			
T-ETIT-100533	Electrical Engineering for Business Engineers, Part I	3 CR	Menesklou

Competence Certificate
The assessment of the module is carried out by a written examination about the lecture *Electrical Engineering I* [23223] (according to Section 4(2), 1 of the examination regulation).

The grade of the module corresponds to the grade of this examination.

Competence Goal
The student knows and understands basic terms of electrical engineering and should be able to carry out simple calculations of DC and AC circuits.

Content
Supporting the lecture, assignments to the curriculum are distributed. These are solved into additional (voluntary) tutorials.

Workload
See German version.

M 6.17 Module: Emphasis in Fundamentals of Engineering [M-MACH-101261]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

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

Election block: Specialization in Fundamentals of Engineering (at least 9 credits)			
T-ETIT-100534	Electrical Engineering for Business Engineers, Part II	5 CR	Menesklou
T-MACH-102079	Material Science II for Business Engineers	5 CR	Hoffmann
T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics	5 CR	Fidlin

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 examinations take place at the beginning of the recess period. 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 removed from the average of the partial examinations, with at least two partial exams need to be.

Competence Goal
Students acquire and deepen skills in engineering fundamentals and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.

Annotation
Starting winter term 2016/1017 the course "Introduction to Engineering Mechanics II : Dynamics" [2162276] will be held in winter term.

Workload
See German version.

M 6.18 Module: Emphasis Materials Science [M-MACH-101262]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

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

Election block: Specialization Materials Science (at least 9 credits)			
T-MACH-102079	Material Science II for Business Engineers	5 CR	Hoffmann
T-MACH-102141	Constitution and Properties of Wearresistant Materials	4 CR	Ulrich
T-MACH-100287	Introduction to Ceramics	6 CR	Hoffmann
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-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-102170	Structural and Phase Analysis	4 CR	Wagner
T-MACH-100531	Systematic Materials Selection	4 CR	Dietrich, Schulze

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 examinations take place at the beginning of the recess period. 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 removed from the average of the partial examinations, with at least two partial exams need to be.

Competence Goal
Students acquire and deepen skills in fundamentals 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
The module content depends on the elected courses.

Workload
The module requires an average workload of 270 hours.

M 6.19 Module: Empirical Finance [M-WIWI-105035]

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

Credits	Recurrence	Language	Level	Version
9	Each winter term	English	3	2

Mandatory			
T-WIWI-110216	Empirical Finance	6 CR	Ulrich
T-WIWI-110217	Python for Empirical Finance	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 "Empirical Finance" is carried out in form of a written exam (90 minutes), the assessment of "Python for Empirical Finance" is carried out in form of six biweekly 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 the fundamental concepts of modern portfolio theory and their realization in Python. The course focuses on the implementation of statistical concepts in Python, such that students are able to make investment decision under uncertainty after successful completion of this module.

Content
The module covers several topics, among them:

- Mean-Variance Portfolio Optimization
- Modeling Distribution of Asset Returns with Factor Models and ARMA-GARCH
- Monte-Carlo Simulation
- Parameter Estimation with Maximum Likelihood and Regressions?

Recommendation
Prior knowledge of statistics 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 6.20 Module: Energy Economics [M-WIWI-101464]

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

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

Mandatory			
T-WIWI-102746	Introduction to Energy Economics	5,5 CR	Fichtner
Election block: Supplementary Courses (3,5 credits)			
T-WIWI-102607	Energy Policy	3,5 CR	Wietschel
T-WIWI-100806	Renewable Energy-Resources, Technologies and Economics	3,5 CR	Jochem, McKenna

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) about the lecture *Introduction into Energy Economics* [2581010] and one optional lecture of the 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

- is able to understand interdependencies in energy economics and to evaluate ecological impacts in energy supply,
- is able to assess the different energy carriers and their characteristics,
- knows the energy political framework conditions,
- gains knowledge about new market-based conditions and the cost and potentials of renewable energies in particular.

Prerequisites
The lecture *Introduction into Energy Economics* [2581010] has to be examined.

Content
Introduction to Energy Economics: Characterisation (reserves, suppliers, cost, technologies) of different energy carriers (coal, gas, oil, electricity, heat etc.)

Renewable Energy - Resources, Technology and Economics: Characterisation of different renewable energy carriers (wind, solar, hydro, geothermal etc.)

Energy Policy: Management of energy flows, energy-political targets and instruments (emission trading etc.)

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.

Annotation
Additional study courses (E.g. from other universities) can be transferred to the grade of the module on special request at the institute.

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

M 6.21 Module: Energy Generation and Network Components [M-ETIT-101165]

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

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Compulsory Elective Modules (Business Administration oder Engineering Sciences)

Credits	Recurrence	Duration	Level	Version
9	Each term	2 semester	3	2

Mandatory			
T-ETIT-101924	Power Generation	3 CR	Hoferer
T-ETIT-101925	Design and Operation of Power Transformers	3 CR	Leibfried, Schäfer

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 examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

Competence Goal
The student

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

Prerequisites
It is only possible to choose this module in combination with the module *Power Networks* [WW3INGETIT3]. The module is passed only after the final partial exam of *Power Networks* is additionally passed.

Content
The module deals with basic knowledge about the structure and operation of electrical power networks and their needed facilities. Further lectures give an insight into specific topics, such as Automation in electric power engineering or the procedures for generating electrical energy.

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

M 6.22 Module: Engineering Mechanics [M-MACH-101259]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (mandatory)

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

Mandatory			
T-MACH-102208	Introduction to Engineering Mechanics I: Statics and Strength of Materials	3 CR	Fidlin

Competence Certificate
The assessment consists of a written examination taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.

Permitted utilities: non-programmable calculator, literature

Competence Goal
The student

- knows and understands the basic elements of statics,
- is able to solve basic problems in statics indipendently.

Prerequisites
None

Content
Statics: force • moment • general equilibrium conditions • center of gravity • inner forces in structure • plane frameworks • adhesion

Annotation
Starting summer 2016 the course "Introduction to Engineering Mechanics I : Statics and Strength of Materials" [2162238] will be held in summer term.

Workload
The total workload for this module is approximately 90 hours

Learning type
Lecture and exercises

M 6.23 Module: Essentials of Finance [M-WIWI-101435]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German	3	2

Mandatory			
T-WIWI-102605	Financial Management	4,5 CR	Ruckes
T-WIWI-102604	Investments	4,5 CR	Uhrig-Homburg

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

- has fundamental skills in modern finance
- has fundamental skills to support investment decisions on stock, bond and derivative markets
- applies concrete models to assess investment decisions on financial markets as well as corporate investment and financing decisions.

Prerequisites
None

Content
The module *Essentials of Finance* deals with fundamental issues in modern finance. The courses discuss fundamentals of the valuation of stocks. A further focus of this module is on modern portfolio theory and analytical methods of capital budgeting and corporate finance.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.24 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 (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Level	Version
9	Once	3	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 6.25 Module: Foundations of Informatics [M-WIWI-101417]

Responsible: Dr. rer. nat. Pradyumn Kumar Shukla
Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: Informatics (mandatory)

Credits	Recurrence	Duration	Level	Version
10	Each term	2 semester	3	1

Mandatory			
T-WIWI-102749	Foundations of Informatics I	5 CR	Sure-Vetter
T-WIWI-102707	Foundations of Informatics II	5 CR	Rettinger

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 and 3 of the examination regulation) of the individual courses of this module.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. For a successful module assessment both partial exams have to be passed.

- Foundations of Informatics I: Written exam in the first week of the recess period (60 min)
- Foundations of Informatics II: Written exam in the first week of the recess period (90 min). It is possible to gain 0,3-0.4 additional grading points for a passed exam by successful completion of a bonus exam.

When both partial exams are passed, the overall grade of the module is the average of the grades for each course weighted by the credit points and truncated after the first decimal.

Competence Goal
The student

- knows the main principles, methods and systems of computer science,
- can use this knowledge for applications in advanced computer science courses and other areas for situation-adequate problem solving,
- is capable of finding strategic and creative responses in the search for solutions to well defined, concrete, and abstract problems.

The student can deepen the learned concepts, methods, and systems of computer science in advanced computer science lectures.

Prerequisites
None

Content
This module conveys knowledge about modeling, logic, algorithms, sorting and searching algorithms, complexity theory, problem specifications, and data structures. From the field of theoretical computer science, formal models of automata, languages and algorithms are presented and applied to the architecture of computer systems.

Recommendation
It is strongly recommended to attend the courses of the core program in the following sequence: *Introduction to Programming with Java*, *Foundations of Informatics I*, *Foundations of Informatics II*

Workload
The total workload for this module is approximately 300 hours.

M 6.26 Module: Foundations of Marketing [M-WIWI-101424]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	3	5

Mandatory			
T-WIWI-102805	Managing the Marketing Mix	4,5 CR	Klarmann
Election block: Supplementary Courses (at least 4,5 credits)			
T-WIWI-102806	Services Marketing and B2B Marketing	3 CR	Klarmann
T-WIWI-102807	International Marketing	1,5 CR	Feurer

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

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

Prerequisites
The course *Marketing Mix* is compulsory and must be examined.

Content
The core course of the module is “Marketing Mix”. This course is compulsory and must be examined. “Marketing Mix” contains instruments and methods that enable you to goal-oriented decisions in the operative marketing management (product management, pricing, promotion and sales management).

To deepen the marketing knowledge students can complete the courses “Services- and B2B-Marketing” and “International Marketing”.

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

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

M 6.27 Module: Fundamentals of Business Administration 1 [M-WIWI-101494]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Prof. Dr. Marcus Wouters

Organisation: KIT Department of Economics and Management

Part of: Business Administration (mandatory)

Credits	Recurrence	Duration	Level	Version
7	Each term	3 semester	3	1

Mandatory			
T-WIWI-102817	Business Administration: Strategic Management and Information Engineering and Management	3 CR	Nieken, Ruckes
T-WIWI-102819	Business Administration: Finance and Accounting	4 CR	Ruckes, Uhrig-Homburg, Wouters

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the individual courses of this module. The examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedure of each course of this module is defined for each course 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 core skills in business administration in particular with respect to decision making and the model based view of business corporations
- masters the fundamentals of business and information management as well as the fundamentals business finance and the principles of business accounting
- is able to analyze and assess central tasks, functions and decisions in modern corporations

The knowledge of the two fundamentals modules in business administration forms the basis for the successful completion of advanced courses in the field of business administration and management.

Prerequisites
None

Content
This module provides the fundamentals of business administration and management. Further, the module focuses on the fields of management and organization, information engineering and management, investment and financing as well as of the principles of management and financial accounting.

Recommendation
It is strongly recommended to take the courses in the first semester of study.

Workload
The total workload of the module is about 210 hours. The workload is proportional to the credit points of the individual courses.

M 6.28 Module: Fundamentals of Business Administration 2 [M-WIWI-101578]

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

Credits	Recurrence	Language	Level	Version
8	Each term	German	3	1

Mandatory			
T-WIWI-102818	Business Administration: Production Economics and Marketing	4 CR	Fichtner, Klarmann, Lützkendorf, Ruckes, Schultmann
T-WIWI-102816	Financial Accounting and Cost Accounting	4 CR	Strych

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. The examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedures of each course of this module is defined for each course 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 core skills in business administration in particular with respect to decision making and the model based view of business corporations
- masters the fundamentals of production and operations management and marketing as well as the fundamentals of management and financial accounting
- is able to analyze and assess central tasks, functions and decisions in modern corporations

The knowledge of the two fundamentals modules in business administration forms the basis for the successful completion of advanced courses in the field of business administration and management.

Prerequisites
None

Content
The basics of internal and external accounting and general business administration are taught as the theory of business in the company. Building on this, the focus will be on marketing and production management.

Recommendation
It is strongly recommended to take the courses in the second semester (Betriebswirtschaftslehre: Produktionswirtschaft und Marketing) and third semester (Rechnungswesen) of study.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.29 Module: Fundamentals of Construction [M-BGU-101004]

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

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

Mandatory			
T-BGU-101691	Construction Technology	6 CR	Haghsheno
T-BGU-101675	Project Management	3 CR	Haghsheno

Competence Goal
The student

- is familiar with all substantial domains of construction
- knows and understands substantial construction methods and construction machines
- masters basic construction calculations
- knows and understands the fundamentals of project management in civil engineering
- can apply his / her knowledge in a goal-oriented manner to accomplish a construction project efficiently

Prerequisites
none

Recommendation
None

Annotation
We encourage students to deepen their knowledge in construction by building additional customized modules from the courses offered by TMB. Please consult with the tutors of this module. Further information is available at www.tmb.kit.edu.

M 6.30 Module: Fundamentals of Digital Service Systems [M-WIWI-102752]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	6

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-109938	Digital Services	4,5 CR	Satzger, Weinhardt
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-110888	Practical Seminar: Digital Services	4,5 CR	Satzger, 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 services from different perspectives and the concept of value creation in service networks
- know about the concepts, methods and tools for the design, modelling, development and management of digital services and are able to use them
- understand the basic characteristics and effects of integrated information system as a an integral element of digital services
- gain experience in group work as well as in the analysis of case studies and the professional presentation of research results
- practice skills in the English language in preparation of jobs in an international environment

Prerequisites
None

Content
Global economy is increasingly determined by services: in industrialized countries nearly 70% of gross value added is achieved in the tertiary sector. Unfortunately, for the design, development and the management of services traditional concepts focused on goods are often insufficient or inappropriate. Besides, the rapid technical advance in the information and communication technology sector pushesthe economic importance of digital services even further thus changing the competition environment. ICT-based interaction and individualization open up completely new dimensions of shared value between clients and providers, dynamic and scalable “service value networks” replace established value chains, digital services are provided globally crossing geographical boundaries. This module establishes a basis for further specialization in service innovation, service economics, service design, service modelling, service analytics as well as the transformation and coordination of service networks.

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

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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 6.32 Module: Human Resources and Organizations [M-WIWI-101513]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	4

Mandatory			
T-WIWI-102909	Human Resource Management	4,5 CR	Nieken
Election block: Supplementary Courses (between 4,5 and 5,5 credits)			
T-WIWI-102630	Managing Organizations	3,5 CR	Lindstädt
T-WIWI-102908	Personnel Policies and Labor Market Institutions	4,5 CR	Nieken
T-WIWI-102871	Problem Solving, Communication and Leadership	2 CR	Lindstädt

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

- knows and analyzes basic concepts, instruments, and challenges of present human resource and organizational management.
- uses the techniques he / she has learned to evaluate strategic situations which occur in human resource and organizational management.
- evaluates the strengths and weaknesses of existing structures and rules based on systematic criterions.
- Discusses and evaluates the practical use of models and methods by using case studies.
- has basic knowledge of fit and challenges of different scientific methods in the context of personnel and organizational economics.

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

Content
Students acquire basic knowledge in the field of human resource and organizational management. Strategic as well as operative aspects of human resource management practices are analyzed. The module offers an up-to-date overview over basic concepts and models. It also shows the strengths and weaknesses of rational concepts in human resources and organizational management.

The students learn to apply methods and instruments to plan, select, and manage staff. Current issues of organizational management or selected aspects of personnel politics are examined and evaluated.

The focus lies on the strategic analysis of decisions and the use microeconomic or behavioral approaches. Empirical results of field or lab studies are discussed critically.

Recommendation
Completion of module Business Administration is recommended.

Basic knowledge of microeconomics, game theory and statistics is recommended.

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

M 6.33 Module: Industrial Production I [M-WIWI-101437]

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

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

Mandatory			
T-WIWI-102606	Fundamentals of Production Management	5,5 CR	Schultmann
Election block: Supplementary Courses (3,5 credits)			
T-WIWI-102870	Logistics and Supply Chain Management	3,5 CR	Schultmann, Wiens
T-WIWI-102820	Production Economics and Sustainability	3,5 CR	Schultmann, Volk

Competence Certificate
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course “Fundamentals of Production Management” [2581950] 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 aware of the important role of industrial production and logistics for production management.
- Students shall use relevant concepts of production management and logistics in an adequate manner.
- Students shall be able to reflect on decision principles in firms and their circumstances in the light of the production management aspects studied.
- Students shall be proficient in describing essential tasks, difficulties and solutions to problems in production management and logistics
- Students shall be able to describe relevant approaches of modeling production and logistic systems.
- Students shall be aware of the important role of material and energy-flows in production systems.
- Students shall be proficient in using exemplary methods for solving selected problems.

Prerequisites
The course “Fundamentals of Production Management” [2581950] and one additional activity have to be chosen.

Content
This module is designed to introduce students into the wide area of industrial production and logistics management. It focuses on strategic production management under the aspect of sustainability. The courses use interdisciplinary approaches of systems, also theory to describe the central tasks of industrial production management and logistics. Herein, attention is drawn upon strategic corporate planning, research and development as well as site selection. Students will obtain knowledge in solving internal and external transport and storage problems with respect to supply chain management and disposal logistics.

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 6.34 Module: Information Systems & Digital Business: Interaction [M-WIWI-104911]

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

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	3

Election block: Compulsory Elective Area ()			
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-109936	Platform Economy	4,5 CR	Dorner, Weinhardt
T-WIWI-109935	Practical Seminar Interaction	4,5 CR	Mädche, Weinhardt
T-WIWI-106569	Consumer Behavior	4,5 CR	Scheibehenne

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP.
The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

Competence Goal
Students

- understand the basic concepts of interactive systems as well as the economic foundations and key components of platforms
- explore the theoretical grounding of interactive systems leveraging theories from reference disciplines such as psychology
- understand business models, network effects of digital platforms and get to know different market forms and market mechanisms
- gain experience in group work as well as in the analysis of case studies and the professional presentation of research results

Content
The "Information Systems & Digital Business" modules of the research groups of Prof. Dr. Alexander Mädche (Information Systems & Service Design), Prof. Dr. Gerhard Satzger (Digital Service Innovation) and Prof. Dr. Christof Weinhardt (Information & Market Engineering), offer a comprehensive overview on important topics of digitalization – blending aspects of digital interaction, digital services and the platform economy.

Courses in this module cover the aspects of interaction between humans and information systems as well as the economic foundations of platform businesses:

- **Foundations of Interactive Systems:** Advanced information and communication technologies (ICT) make interactive systems ever-present in the users' private and business life. They are an integral part of E-Commerce portals or social networking sites as well as at the workplace, e.g. in the form of collaboration portals or analytical dashboards. Furthermore, with the ever-increasing capabilities of ICT, the design of human-computer interaction is becoming increasingly important. The aim of this module is to introduce the foundations, related theories, key concepts, and design principles as well as current practice of contemporary interactive systems. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

- **Platform Economy:** Apple, Alphabet, Amazon, Microsoft, und Facebook; five of the most valuable companies worldwide create large portions of their profits employing a digital platform model. This module teaches the key design considerations of digital platforms: their foundations in economic theory, their core components and design aspects, the adequate selection of market mechanisms for achieving certain goals and the role of user behavior in the context of digital platforms. The theoretic foundations are enriched by discussions of several real-world examples, e.g. from the finance sector. Thus, the students are enabled to a) analyze given platforms and make recommendations for improvements and b) independently design new platforms for given use cases.

- **Consumer Behavior:** Consumer decisions are ubiquitous in daily life and they can have long-ranging and important consequences for individual (financial) well-being and health but also for societies and the planet as a whole. To help people making better choices it is important to understand the factors that influence their behavior. Towards this goal, we will explore how consumer behavior is shaped by social influences, situational and cognitive constraints, as well as by emotions, motivations, evolutionary forces, neuronal processes, and individual differences. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates. The lecture will be held in English.

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). 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 6.35 Module: Information Systems & Digital Business: Platforms [M-WIWI-104912]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	4

Election block: Compulsory Elective Courses ()			
T-WIWI-109938	Digital Services	4,5 CR	Satzger, Weinhardt
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-109936	Platform Economy	4,5 CR	Dorner, Weinhardt
T-WIWI-109937	Practical Seminar Platforms	4,5 CR	Satzger, Weinhardt

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP.
The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

Competence Goal
Students

- understand services from different perspectives, the concept of value creation in service systems as well as the economic foundations and key components or platforms
- get familiar with concepts, methods and tools for the design, modelling, development and management of digital services and platforms
- understand the categories and trends of platforms as providers of digital services
- gain experience in group work as well as in the analysis of case studies and the professional presentation of research results
- are enabled to design new platforms based on a business idea.

Content
The “Information Systems & Digital Business” modules of the research groups of Prof. Dr. Alexander Mädche (Information Systems & Service Design), Prof. Dr. Gerhard Satzger (Digital Service Innovation) and Prof. Dr. Christof Weinhardt (Information & Market Engineering), offer a comprehensive overview on important topics of digitalization – blending aspects of digital interaction, digital services and the platform economy.

Courses in this module cover the technical and economic aspects of digital services as well as their application in the platform economy:

- **Digital Services:** The global economy is increasingly determined by services: in industrialized countries, nearly 70% of gross value added is achieved in the tertiary sector. For the design, development and the management of services traditional “goods-focused” concepts are often insufficient or inappropriate – even more so, if companies reap the ample opportunities to offer digital services. The course is centered around the concepts of joint value creation within service systems. It covers the theoretical background of services and service innovation, technical and economic aspects of cloud and cloud labor services as well as webservices. It focusses on the potential to leverage data for novel digital services and business models and to form dynamic and scalable service value networks. It comprises hands-on experience to conceive and build novel digital, cloud-based services.

- **Platform Economy:** Apple, Alphabet, Amazon, Microsoft, und Facebook; five of the most valuable companies worldwide create large portions of their profits employing a digital platform model. This module teaches the key design considerations of digital platforms: their foundations in economic theory, their core components and design aspects, the adequate selection of market mechanisms for achieving certain goals and the role of user behavior in the context of digital platforms. The theoretic foundations are enriched by discussions of several real-world examples, e.g. from the finance sector. Thus, the students are enabled to a) analyze given platforms and make recommendations for improvements and b) independently design new platforms for given use cases.

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). 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 6.36 Module: Information Systems & Digital Business: Servitization [M-WIWI-104913]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Gerhard Satzger

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	2

Election block: Compulsory Elective Courses ()			
T-WIWI-109938	Digital Services	4,5 CR	Satzger, Weinhardt
T-WIWI-109816	Foundations of Interactive Systems	4,5 CR	Mädche
T-WIWI-109939	Practical Seminar Servitization	4,5 CR	Mädche, Satzger

Competence Certificate
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP.
The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

Competence Goal
Students

- understand services from different perspectives and the concept of value creation in service systems
- get familiar with concepts, methods and tools for the design, modelling, development and management of digital services and interactive systems
- understand the basic characteristics and effects of interactive systems as an integral element of digital services – theoretically grounded in reference disciplines such as psychology
- get hands-on experience in conceptualizing and designing digital services and interactive systems in real use cases.

Content
The “Information Systems & Digital Business” modules of the research groups of Prof. Dr. Alexander Mädche (Information Systems & Service Design), Prof. Dr. Gerhard Satzger (Digital Service Innovation) and Prof. Dr. Christof Weinhardt (Information & Market Engineering), offer a comprehensive overview on important topics of digitalization – blending aspects of digital interaction, digital services and the platform economy.

Courses in this module cover the technical and economic aspects of digital services as well as the interaction of humans with information systems:

- **Digital Services:** The global economy is increasingly driven by services: in industrialized countries, nearly 70% of gross value added is achieved in the tertiary sector. For the design, development and the management of services traditional “goods-focused” concepts are often insufficient or inappropriate – even more so, if companies reap the ample opportunities to offer digital services. The course is centered around the concepts of joint value creation within service systems. It covers the theoretical background of services and service innovation, technical and economic aspects of cloud and cloud labor services as well as webservices. It focuses on the potential to leverage data for novel digital services and business models and to form dynamic and scalable service value networks. It comprises hands-on experience to conceive and build novel digital, cloud-based services.

- **Foundations of Interactive Systems:** Advanced information and communication technologies (ICT) make interactive systems ever-present in the users’ private and business life. They are an integral part of E-Commerce portals or social networking sites as well as at the workplace, e.g. in the form of collaboration portals or analytical dashboards. Furthermore, with the ever-increasing capabilities of ICT, the design of human-computer interaction is becoming increasingly important. The aim of this module is to introduce the foundations, related theories, key concepts, and design principles as well as current practice of contemporary interactive systems. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). 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 6.37 Module: Integrated Production Planning [M-MACH-101272]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German	3	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 6.38 Module: Internship [M-WIWI-101419]

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

Credits	Recurrence	Level	Version
10	Once	3	1

Mandatory			
T-WIWI-102611	Internship	10 CR	Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

Competence Certificate
The assessment is carried out by the evidence of completed full-time internships of at least 12 weeks with at least 20 working hours per week and a presentation of the internship in the form of a written report on the activities. The internship is not graded.

1. Information on evidence of completed full-time internships:

The internship is proofed by the certificate of the intern's office. The certificate has to be formally correct with official corporate letterhead and handwritten countersigned by a responsible employee of the company.

The certificate must at least contain the following information:

* Company / Location
* Duration: from ... to ...
* Hours of work (weakly)
* Working interruption, indicating the vacation and sick days
* Department
* Headwords to the activitis

2. Information on to the presentation:

The internship report should be at least one page (typewritten, not handwritten) for each Location. It must be countersigned by a representative of the intern's office.

Competence Goal

- has general insight into the essential processes in a company,
- is in a position to identify operation correlations and has the knowledge and skills to facilitate a fast understanding of the processes in the company,
- in addition to practical professional experience and competences, also has key competences such as own initiative, ability to work in a team and communication skills as well as ability to integrate into corporate hierarchies and procedures,
- has the experience to accomplish complex IT and business tasks under realistic conditions within the framework of the relevant legal aspects and while applying the total acquired knowledge (interlaced thinking),
- has an idea of the professional development potential in the economy through pursuit of study-related activities,
- knows the technical and professional requirements in the individually targeted future occupation and can take this knowledge into account for the future planning of his/her studies and career,
- can assess and estimate own technical and professional strengths and weaknesses through his/her evaluation of the company.

Prerequisites
None

Content
The internship may be done in economic, business and/or technical companies. At best, it is done on activities which are located at the intersection of the two fields - getting to know the specific requirements of Industrial Engineering and Management.
A commercial internship provides an insight into business or administrative processes of business transactions. Therefor departments such as controlling, organizing, marketing and planning appear particularly suitable.

Work experiences in the departments of engineering, work preparation and provision of material or IT cover more technical aspects of the internship. But work experiences in an engineering firm go with a technical internship.

It remains the companies and interns left, which stations and areas the intern will eventually go through. But the focus should always be in accordance with operational realities of the company.

Annotation
Internships, that were completed even before studying may be recognized, if the criteria for recognition are met. After recognition of the compulsory internship, there can be taken a semester off for a voluntary, student-related internship.

Regarding to the election of the company, in which the internship is completed, there are no specific rules. With a view to the future professional career, it is recommended to absolve the internship in a larger, possibly international company.

Vacation days are not figured into the internship.

Only three sick leave days may incurred at all. Any additional sick days are not figured into the internship.

A relevant vocational education of at least two years is accepted as a performance equivalent to the internship.

Workload
The total workload for this module is approximately 300 hours.

M 6.39 Module: Introduction to Economics [M-WIWI-101398]

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

Credits	Recurrence	Duration	Level	Version
10	Each term	2 semester	3	1

Mandatory			
T-WIWI-102708	Economics I: Microeconomics	5 CR	Puppe, Reiß
T-WIWI-102709	Economics II: Macroeconomics	5 CR	Wigger

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. The assessment procedures of each course of this module is defined for each course separately.

Competence Goal
The student

- knows and understands basic economic problems,
- understands economic policy in globalized markets,
- is able to develop elementary solution concepts.

The lectures of this module have different focuses: In Economics I, economic problems are seen as decision problems, Economics II treats the dynamics of economic processes.

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

Content
The basic concepts, methods and models of micro- and macroeconomics are treated. The course *Economics I: Microeconomics [2600012]* deals with micro-economic decision theory, questions of market theory and problems of imperfect competition and with basic principles of game theory and welfare economics. *Economics II: Macroeconomics [2600014]* discusses economic organization models and national accounts as well as the question of international trade and monetary policy. Furthermore, the complex growth, boom and economic speculations are dealed with.

Annotation
Notice: The lecture *Economics I*: *Microeconomics* [2600012] is part of the preliminary examination concerning § 8(1) of the examination regulation. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Workload
See German version.

M 6.40 Module: Introduction to Natural Hazards and Risk Analysis [M-WIWI-104838]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	3

Election block: Compulsory Elective Courses (between 9 and 12 credits)			
T-BGU-101500	Introduction to Engineering Geology	5 CR	Blum
T-BGU-103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite	3 CR	Rösch, Wursthorn
T-BGU-101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences	3 CR	Rösch, Wursthorn
T-BGU-101637	Systems of Remote Sensing, Prerequisite	1 CR	Hinz, Weidner
T-BGU-101638	Procedures of Remote Sensing, Prerequisite	1 CR	Weidner
T-BGU-101636	Remote Sensing, Exam	4 CR	Hinz, Weidner
T-BGU-103542	Procedures of Remote Sensing	3 CR	Weidner
T-PHYS-103525	Geological Hazards and Risk	8 CR	Gottschämmer
T-BGU-101693	Hydrology	4 CR	Zehe
T-PHYS-101092	Climatology	5 CR	Ginete Werner Pinto, Maurer
T-BGU-101814	Project in Applied Remote Sensing	1 CR	Hinz, Weidner
T-PHYS-105594	Exam on Climatology	1 CR	Ginete Werner Pinto
T-BGU-101667	Hydraulic Engineering and Water Management	4 CR	Nestmann

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
There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations".

Content
See German version

Recommendation
The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

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 6.41 Module: Introduction to Operations Research [M-WIWI-101418]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: Operations Research (mandatory)

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	2 semester	German	3	1

Mandatory			
T-WIWI-102758	Introduction to Operations Research I and II	9 CR	Nickel, Rebennack, Stein

Competence Certificate
The assessment of the module is carried out by a written examination (120 minutes) according to Section 4(2), 1 of the examination regulation.

In each term (usually in March and July), one examination is held for both courses.

Competence Goal
The student

- names and describes basic notions of the essential topics in Operations Research (Linear programming, graphs and networks, integer and combinatorial optimization, nonlinear programming, dynamic programming and stochastic models),
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Module grade calculation
The overall grade of the module is the grade of the written examination.

Prerequisites
None

Content
This module treats the following topics: linear programming, network models, integer programming, nonlinear programming, dynamic programming, queuing theory, heuristic models.

This module forms the basis of a series of advanced lectures with a focus on both theoretical and practical aspects of Operations Research.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.42 Module: Introduction to Programming [M-WIWI-101581]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: Informatics (mandatory)

Credits	Recurrence	Language	Level	Version
5	Each winter term	German	3	1

Mandatory			
T-WIWI-102735	Introduction to Programming with Java	5 CR	Zöllner

Competence Certificate
The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation.
The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.
The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Competence Goal
see german version

Prerequisites
None

Content
see german version

Workload
The total workload for this course is approximately 150 hours. For further information see German version.

M 6.43 Module: Introduction to Statistics [M-WIWI-101432]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Statistics

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

Mandatory			
T-WIWI-102737	Statistics I	5 CR	Grothe, Schienle
T-WIWI-102738	Statistics II	5 CR	Grothe, Schienle

Competence Certificate
The assessment of this module consists of two written examinations according to Section 4(2), 1 of the examination regulation (one for each of the courses Statistics I and II).

The overall grade of the module is the average of the grades of these two written examinations.

Competence Goal
See German version.

Module grade calculation
The overall grade of the module is the average of the grades of these two written examinations.

Prerequisites
Notice: The lecture *Statistics I* [25008/25009] is part of the preliminary examination concerning Section 8(1) of the examination regulation. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Content
The module contains the fundamental methods and scopes of Statistics.

A. Descriptive Statistics: univariate und bivariate analysis

B. Probability Theory: probability space, conditional and product probabilities, transformation of probabilities, parameters of location and dispersion, most importand discrete and continuous distributions, covariance and correlation, limit distributions

C. Theory of estimation and testing: suffiency of statistics, point estimation (optimality, ML-method), internal estimations, linear regression

Workload
The total workload for this module is approximately 300 hours. For further information see German version.

M 6.44 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 (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Language	Level	Version
9	Each summer term	German/English	3	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 6.45 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 (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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 6.46 Module: Management Accounting [M-WIWI-101498]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	2 semester	English	3	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 6.47 Module: Manufacturing Technology [M-MACH-101276]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Duration	Language	Level	Version
9	Each winter term	1 semester	German	3	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 6.48 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 (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Language	Level	Version
9	Each winter term	German	3	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 6.49 Module: Materials Science [M-MACH-101260]

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

Part of: Engineering Sciences (mandatory)

Credits	Recurrence	Duration	Level	Version
3	Each winter term	1 semester	3	1

Mandatory			
T-MACH-102078	Materials Science I	3 CR	Hoffmann

Competence Certificate
The assessment of the module is carried out by a written examination (150 min) about the lecture*Material Science*[2125760] (according to Section 4(2), 1 of the examination regulation).
The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.

The grade of the module corresponds to the grade of this examination.

Competence Goal
Students are able to specify the basics of materials science and engineering and can apply it to simple problems in various technical areas.

As major part of the module, the students know the correlation between atomic structure and bonding of solids and the macroscopic properties such as mechanical behavior or electrical conductivity. They have basic knowledge with respect to materials characterization. The students are able to analyze phase diagrams with up to two components and can derive simple correlations among composition, processing, microstructure evolution and materials properties.

Prerequisites
None.

Content
After an introduction to the atomic structure and interatomic bonding, elementary concepts of crystallography are given. Different types of crystal structures are explained and various types of imperfections in solids. Then, the mechanical behaviour and the physical properties of various types of materials (metals, polymers, ceramics) are discussed. The thermodynamic principles of solidification and the basic types of phase diagrams are given to understand to iron-carbon phase diagram and the manifold microstructures of steel and cast iron.

Workload
The total workload for this module is approximately 90 hours.

M 6.50 Module: Mathematics 1 [M-MATH-101676]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematics

Credits	Recurrence	Language	Level	Version
7	Each winter term	German	3	1

Mandatory			
T-MATH-102260	Mathematics I - Midterm Exam	3,5 CR	Folkers, Hug, Last, Winter
T-MATH-102261	Mathematics I - Final Exam	3,5 CR	Folkers, Hug, Last, Winter

Competence Certificate
The assessment consists of two written exams of 60 min each (in accordance with §4(2), 1 of the examination regulations). The first (midterm) exam takes place after half of the course, the second (final) exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are not allowed. Resit exams for both exams are offered in the first weeks of the subsequent semester.

Competence Goal
Students

- are confident with basic terms and definitions of mathematical language (propositions, sets, number systems, mappings, etc.).
- have a basic knowledge of differentiable calculus for functions of a single variable.

Module grade calculation
The examination mark for Mathematics 1 is the average of the marks obtained in the midterm exam and final exam.

Content
The course Mathematics 1 is the first part of the three semester basic training in higher mathematics. Topics are

- Propositional logic and basic set theory,
- Combinatorics and principles of counting,
- Number systems and basic arithmetics,
- Systems of linear equations,
- Convergence of sequences and series,
- Mappings and functions,
- Continuous functions,
- Differentiable functions,
- Power series and special functions,
- Taylor's theorem.

Recommendation
There are no Prerequisites. We strongly recommend to attend the three maths courses in the order Mathematics 1, Mathematics 2, Mathematics 3.

Workload
work load: 210 hours (7 ECTS)
classes: 60 hours lectures + 30 hours exercises

M 6.51 Module: Mathematics 2 [M-MATH-101677]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematics

Credits	Recurrence	Language	Level	Version
7	Each summer term	German	3	1

Mandatory			
T-MATH-102262	Mathematics II - Midterm Exam	3,5 CR	Folkers, Hug, Last, Winter
T-MATH-102263	Mathematics II - Final Exam	3,5 CR	Folkers, Hug, Last, Winter

Competence Certificate
The assessment consists of two written exams of 60 min each (in accordance with §4(2), 1 of the examination regulations). The first (midterm) exam takes place after half of the course, the second (final) exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are not allowed. Resit exams for both exams are offered in the first weeks of the subsequent semester.

Competence Goal
Students

- know basic concepts of matrix theory.
- have a basic knowledge of integral calculus in a single variable.
- have a basic knowledge of multivariate differential calculus.

Module grade calculation
The examination mark for Mathematics 2 is the average of the marks obtained in the midterm exam and final exam.

Content
The course Mathematics 2 is the second part of the three semester basic training in higher mathematics. Topics are

- Riemann integral,
- n-dimensional vector spaces,
- scalar product, length and angle,
- linear mappings and matrices,
- determinants,
- eigenvalue theory,
- multivariate calculus.

Recommendation
There are no Prerequisites. We strongly recommend to attend the three maths courses in the order Mathematics 1, Mathematics 2, Mathematics 3.

Workload
work load: 210 hours (7 ECTS)
classes: 60 hours lectures + 30 hours exercises

M 6.52 Module: Mathematics 3 [M-MATH-101679]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematics

Credits	Recurrence	Language	Level	Version
7	Each winter term	German	3	1

Mandatory			
T-MATH-102264	Mathematics III - Final Exam	7 CR	Folkers, Hug, Last, Winter

Competence Certificate
The assessment consists of a written exams of 105 min (in accordance with §4(2), 1 of the examination regulations). The exam takes place shortly after the end of the lectures. Auxiliary means such as literature or calculators are allowed. A resit exam is offered in the first weeks of the subsequent semester.

Competence Goal
Students

- are confident with important concepts in the theory of normed vector spaces.
- have some basic knowledge of ordinary differential equations.
- have some basic knowledge of Fourier analysis.

Module grade calculation
The examination mark for Mathematics 3 is the mark of the written exam.

Content
The course Mathematics 3 is the third part of the three semester basic training in higher mathematics. Topics are

- Multiple integrals,
- Implicit functions,
- General linear spaces,
- Normed vector spaces,
- Banach's fixed point theorem,
- Ordinary differential equations,
- Linear differential equations,
- Fourier analysis,
- Integral transformations.

Workload
work load: 210 hours (7 ECTS)
classes: 60 hours lectures + 30 hours exercises

M 6.53 Module: Mechanical Design [M-MACH-101299]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

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

Mandatory			
T-MACH-110363	Mechanical Design Basics I and II	7 CR	Albers, Matthiesen
T-MACH-110364	Mechanical Design Basics I, Tutorial	1 CR	Albers, Matthiesen
T-MACH-110365	Mechanical Design Basics II, Tutorial	1 CR	Albers, Matthiesen

Competence Certificate
Written examination on the contents of Mechanical Design I&II

Duration: 90 min plus reading time

Preliminary examination: Successful participation in the preliminary work in the field of Mechanical Design I&II

Competence Goal
Learning object springs:

- be able to recognize spring types and explain stress
- Identify and describe the properties of a resilient LSS in machine elements presented later on
- Understanding and explaining the principle of action
- Know and list areas of application for springs
- graphically illustrate the load and the resulting stresses
- be able to describe the degree of species usefulness as a means of lightweight construction
- be able to analyse different solution variants with regard to lightweight construction (use species efficiency)
- Being able to explain several springs as a circuit and calculate total spring stiffness

Learning objects Technical Systems:

- Being able to explain what a technical system is
- "Thinking in systems."
- Using system technology as an abstraction tool for handling complexity
- Recognizing functional relationships of technical systems
- Getting to know the concept of function
- be able to use C&C²-A as a means of system technology

Learning objects Visualization:

- Ability to create and interpret schematics
- Using freehand technical drawing as a means of communication
- To be able to apply the technical basics of freehand drawing
- Derivation of 2D representations into different perspective representations of technical structures and vice versa
- Master reading of technical drawings
- Dedicated dimensioning of technical drawings
- Create sectional views of technical systems as a technical sketch

Learning objects Bearings:

- be able to recognize bearings in machine systems and explain their basic functions
- name bearings (type/type/function) and recognize them in machine systems and technical drawings
- Being able to name areas of application and selection criteria for the various bearings and bearing arrangements and explain interrelationships
- Ability to functionally explain the design of the bearing definitions in different directions radially/axially and circumferentially
- Know and describe selection as an iterative process as an example
- be able to perform dimensioning of bearing arrangements as an example of the engineer's approach to dimensioning machine elements
- Develop first ideas for probabilities in predicting the life of machine elements
- Recognise from the damage pattern whether static or dynamic overload was the cause of material failure
- Calculate equivalent static and dynamic bearing loads from the catalogue and given external forces on the bearing
- Being able to name, explain and transfer the basic equation of the dimensioning to the bearing dimensioning

Learning objectives seals:

The students…

- can discuss the basic functions of seals
- can describe the physical causes for mass transfer
- can apply the C&C-Model on seals
- can name, describe and apply the three most important classification criteria of seals
- can explain the function of a contacting seal and a non-contacting seal.
- can differentiate the seal types and organize them to the classification criteria.
- can discuss the structure and the effect of a radial shaft seal
- can evaluate radial shaft seals, compression packings, mechanical seals, gap seals and labyrinth seals
- can describe and apply the constructional principle of selffortification
- can describe the stick-slip phenomenon during the movement sequences of a reciprocating seal

Learning design:

The students…

- understand the meaning of design
- are able to recognize and implement basic rules and principles of design
- are able to design the connection of partial systems into the total system
- can name requirements of design and take them into account
- know the main groups of manufacturing methods

- are able to explain the manufacturing processes
- are able to depict a casted design in a drawing clearly, e.g. draft of the mold, no material accumulation, …
- know how components are designed
- Know how the production of the components has an effect on
- their design
- Know the requirements and boundary conditions on design

Learning bolted connections:

The students…

- can list and explain various bolt applications.
- can recognize bolt types and explain their function
- can build a C&C² model of a bolted joint and discuss the influences on its function
- can explain the function of a bolted connection with the help of a spring model
- can reproduce, apply and discuss the screw equation.
- Can estimate the load-bearing capacity of low-loaded bolted joints for dimensioning purposes
- Can indicate which bolted joint is to be calculated and which only roughly dimensioned.
- Can carry out the dimensioning of bolted connections as flange connections
- Can create, explain and discuss the force deflection diagram of a bolted connection

Prerequisites
None

Content
MKL I:

Introduction to product development

Tools for visualization (technical drawing)

Product creation as a problem solution

Technical Systems Product Development

- Systems theorie
- Contact and Channel Approach C&C²-A

Basics of selected construction and machine elements

- Federn
- bearings and fence
- sealings

The lecture is accompanied by exercises with the following content:

gear workshop

Tools for visualization (technical drawing)

Technical Systems Product Development

- Systemtheorie
- Contact amd Channel Approach C&C²-A

Exercises for springs

Exercises for bearings and fence

MKL II:

- sealings
- design
- dimensioning
- component connections
- bolts

Recommendation
An in-depth study of machine design (parts 3 + 4) can be carried out as part of the "Extracurricular Module in Engineering".

Workload
MKL1:
Attendance at lectures (15 VL): 22,5h

Presence exercises (8 exercises): 12h

Attendance (3x 2h) and preparation (3x3h) Workshop sessions: 15h

Preparation and execution of online test: 6h

Personal preparation and follow-up of lecture and exercise: 34,5h MKL1:

MKL2:

Attendance lectures (15 VL): 22,5h

Presence exercises (7 ÜB): 10,5h

Personal preparation and follow-up of lecture and exercise, incl. prerequisite and preparation for the exam:: 117h

Learning type
Lecture

Tutorial

Project work during the semester

Online-test

M 6.54 Module: Methodical Foundations of OR [M-WIWI-101414]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Research (Specialisation Program Operations Research)
Compulsory Elective Modules (Operations Research)

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	3	9

Election block: Compulsory Elective Courses (at least 1 item as well as between 4,5 and 9 credits)			
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-103638	Global Optimization I and II	9 CR	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CR	Stein
Election block: Supplementary Courses ()			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102727	Global Optimization II	4,5 CR	Stein
T-WIWI-102725	Nonlinear Optimization II	4,5 CR	Stein
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel

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 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 optimization methods, in particular from nonlinear and from global optimization,
- 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.

Prerequisites
At least one of the courses *Nonlinear Optimization I* [2550111] and *Global Optimization I* [2550134] has to be examined.

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous decision variables. The lectures on nonlinear programming deal with local solution concepts, whereas the lectures on global optimization treat approaches for global solutions.

Recommendation
The courses Introduction to Operations Research I and II are helpful.

Annotation
The planned lectures and courses for the next three years are announced online (http://www.ior.kit.edu).

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

M 6.55 Module: Microsystem Technology [M-MACH-101287]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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 6.56 Module: Mobile Machines [M-MACH-101267]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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 6.57 Module: Mobility and Infrastructure [M-BGU-101067]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each summer term	1 semester	German	3	2

Mandatory			
T-BGU-101791	Mobility and Infrastructure	9 CR	Roos, Vortisch

Prerequisites
none

Recommendation
For students from the KIT-Department of Economics and Management it is recommended to take part in the excercises.

Annotation
none

M 6.58 Module: Module Bachelor Thesis [M-WIWI-101601]

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

Credits	Recurrence	Language	Level	Version
12	Each term	German	3	5

Mandatory			
T-WIWI-103067	Bachelor Thesis	12 CR	Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

Competence Certificate
The Bachelor Thesis is a written exam which shows that the student can autonomously investigate a scientific problem in Industrial Engineering and Management. The Bachelor Thesis is described in detail in § 11 (SPO 2007) and § 14 (SPO 2015) of the examination regulation. The review is carried out

- according to SPO 2007 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.
- according to SPO 2015 by at least two examiners of the Department of Economics and Management.

The regular processing time takes three/six months (SPO 2007/SPO2015) . On a reasoned request of the student, the examination board can extend the processing time of a maximum of on month. If the Bachelor 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 Bachelor 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 overall grade of the module is the grade of the Bachelor Thesis.

Competence Goal
The student can independently work on a relevant topic in accordance with scientific criteria within the specified time frame.

He/she is in a position to research, analyze the information, abstract and identify basic principles and regulations from less structured information.

He/she reviews the task ahead, can select scientific methods and techniques and apply them to solve a problem or identify further potential. 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 clearly structure a research paper and communicate in writing using the technical terminology.

Prerequisites
Prerequisites for admission to the Bachelor Thesis:

- according to SPO 2007: the student is in the 3rd Academic year (5th and 6th semester) and has not been completed at most one of the exams of the basic program.
- according to SPO 2015: A minimum of 120 credits must be earned. All module examinations of the basic program must be passed.

At the request of the student, the examination committee decides on exceptions to these regulations.

It is recommended to begin the Bachelor Thesis in the 5th or 6th Semester.
A written confirmation of the examinor about supervising the Bachelor's Thesis is required.
Please pay regard to the institute specific rules for supervising a Bachelor Thesis.
The Bachelor 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 are marked as this." If this declaration is not given, the Bachelor Thesis will not be accepted.

Content
The Bachelor Thesis is the first major scientific work. The topic of the Bachelor 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 360 hours. For further information see German version.

M 6.59 Module: Optimization under Uncertainty [M-WIWI-103278]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: Operations Research (Specialisation Program Operations Research)
Compulsory Elective Modules (Operations Research)

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

Election block: Compulsory Elective Courses (between 1 and 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-106545	Optimization under Uncertainty	4,5 CR	Rebennack
Election block: Supplementary Courses (at most 1 item)			
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel

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

- denominates and describes basic notions for optimization methods under uncertainty, in particular from stochastic optimization,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems under uncertainty 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, in particular of
- stochastic optimization problems.

Prerequisites
At least one of the courses *Introduction to Stochastic Optimization*and *Optimization approaches under uncertainty*has to be taken.

Content
The module focuses on modeling and analyzing mathematical optimization problems where certain data is not fully present at the time of decision-making. The lectures on the introduction to stochastic optimization deal with methods to integrate distribution information into the mathematical model. The lectures on the optimization approaches under uncertainty offer alternative approaches such as robust optimization.

Recommendation
Knowledge from the lectures "Introduction to Operations Research I" and "Introduction to Operations Research II" are helpful.

Annotation
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 of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.60 Module: Power Network [M-ETIT-102379]

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

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

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

Mandatory			
T-ETIT-101923	Electric Energy Systems	5 CR	Leibfried
T-ETIT-100830	Power Network	6 CR	Leibfried

M 6.61 Module: Product Lifecycle Management [M-MACH-101270]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

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

Election block: Product Lifecycle Management (Kernbereich) (1 item)			
T-MACH-105147	Product Lifecycle Management	4 CR	Ovtcharova
Election block: Product Lifecycle Management (2 items)			
T-MACH-102153	PLM-CAD Workshop	4 CR	Ovtcharova
T-MACH-102181	PLM for Product Development in Mechatronics	4 CR	Eigner
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-106744	Agile Product Innovation Management - Value-driven Planning of New Products	4 CR	Kläger
T-MACH-106457	I4.0 Systems Platform	4 CR	Maier, Ovtcharova
T-MACH-102083	Integrated Information Systems for Engineers	4 CR	Ovtcharova
T-MACH-102155	Product, Process and Resource Integration in the Automotive Industry	4 CR	Mbang
T-MACH-102149	Virtual Reality Practical Course	4 CR	Ovtcharova
T-MACH-102187	CAD-NX Training Course	2 CR	Ovtcharova

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

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

Competence Goal
The students should:

- have basic knowledge about the challenges in product and process data management regarding the whole product lifecycle;
- have understanding about challenges and functional concepts of product lifecycle management;
- be able to rudimental operate common PLM/CAx/VR - systems,
- develop and present prototype solutions in teams of different domains.

Prerequisites
None

Content
Product Lifecycle Management (PLM), Generation and management of information, Architecture and functionality of information systems, Industry 4.0, CAx and VR-systems.

Workload
270 hours

M 6.62 Module: Public and Civil Law [M-INFO-105084]

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

Credits	Recurrence	Duration	Level	Version
9	Each term	2 semester	3	2

Mandatory			
T-INFO-103339	Civil Law for Beginners	5 CR	Dreier
T-INFO-110300	Public Law I & II	6 CR	Marsch

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

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

Prerequisites
None

Workload
See German version.

M 6.63 Module: Public Finance [M-WIWI-101403]

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

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German	3	5

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102877	Introduction to Public Finance	4,5 CR	Wigger
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
T-WIWI-109590	Public Sector Finance	4,5 CR	Wigger

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
See German version.

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. Special fields of Public Finance are public revenues, i.e. taxes and public debt, public expenditures for publicly provided goods, and welfare programs.

Recommendation
It is recommended to attend the course 2560129 after having completed the course 2560120.

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

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

M 6.64 Module: Rail System Technology [M-MACH-101274]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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 6.65 Module: Real Estate Management [M-WIWI-101466]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

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

Mandatory			
T-WIWI-102744	Real Estate Management I	4,5 CR	Lützkendorf
T-WIWI-102745	Real Estate Management II	4,5 CR	Lützkendorf

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

- possesses an overview concerning the different facets and interrelationships within the real estate business, the important decision points in real estate lifecycle and the different views and interests of the actors concerned, and
- is capable of applying basic economic methods an procedures to problems within the real estate area.

Prerequisites
None

Content
The real estate business offers graduates very interesting jobs and excellent work- and advancement possibilities. This module provides an insight into the macroeconomic importance of this industry, discusses problems concerned to the administration of real estate and housing companies and provides basic knowledge for making decisions both along the lifecycle of a single building and the management of real estate portfolios. Innovative operating and financing models are illustrated, as well as the current development when looking at real estate as an asset-class.

This module is also suitable for students who want to discuss macroeconomic, business-management or financial problems in a real estate context.

Recommendation
The combination with the module *Design Constructions and Assessment of Green Buildings* is recommended.

Furthermore a combination with courses in the area of

- Finance
- Insurance
- Civil engineering and architecture (building physics, building construction, facility management)

is recommended.

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

M 6.66 Module: Seminar Module [M-WIWI-101816]

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
3	Each term	German	3	5

Election block: Compulsory Elective Courses (3 credits)			
T-WIWI-103486	Seminar in Business Administration (Bachelor)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103485	Seminar in Informatics (Bachelor)	3 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-108763	Seminar in Engineering Science Master (approval)	3 CR	Fachvertreter ingenieurwissenschaftlicher Fakultäten
T-MATH-102265	Seminar in Mathematics (Bachelor)	3 CR	Folkers, Last
T-WIWI-103488	Seminar in Operations Research (Bachelor)	3 CR	Nickel, Rebennack, Stein
T-INFO-101997	Seminar: Legal Studies I	3 CR	Dreier
T-WIWI-103489	Seminar in Statistics (Bachelor)	3 CR	Grothe, Schienle
T-WIWI-103487	Seminar in Economics (Bachelor)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
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

Competence Certificate
SPO 2015: The modul examination consists of **one** seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.

SPO 2007: 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). As key qualification one of the following courses must be chosen: Academic Learning HoC (2-3 credits), Key Qualifikations ZAK (1-3 credits), Elective „Educational development for student teachers“ (2-3 credits) or language courses SpZ. A detailed description of every singled assessment is given in the specific course characerization.

Competence Goal

- Students are able to independently deal with a defined problem in a specialized field based on scientific criteria.
- They are able to research, analyze the information, abstract and derive basic principles and regularities from unstructured information.
- They can solve the problems in a structured manner using their interdisciplinary know-how.
- They know how to validate the obtained results.
- Finally, they are able to logically and systematically present the 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
All modules of the basic program should be completed. For further information see German version.

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
See German version.

M 6.67 Module: Sociology/Empirical Social Research [M-GEISTSOZ-101167]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: Compulsory Elective Modules (Law or Sociology)

Credits	Recurrence	Language	Level	Version
9	Each winter term	German	3	2

Mandatory			
T-GEISTSOZ-109047	Analalysis of Social Structurs (WiWi)	3 CR	Nollmann
T-GEISTSOZ-109048	Social Science A (WiWi)	3 CR	Nollmann
T-GEISTSOZ-109049	Social Science B (WiWi)	3 CR	Nollmann

Competence Goal
The student

- Gains theoretical and methodical knowledge of social processes and structures
- Is able to apply acquired knowledge practically
- Is able to present work results in a precise and clear way

Content
This module offers students the possibility to get to know research problems and to answer these theoretically as well as empirically. For example: Who does earn how much in his job and why? How do subcultures emerge? Why are boys' grades in school always worse than those of girls? Do divorces have negative influences on the development of children? How does mass consumption influence the individual? Is there a world society emerging? In addition, this module contains courses on sociological methods that are essential to answer such questions scientifically.

The lecture on social structure analysis gives an overview of large social structures such as the education system, labour market, institutions, demography, etc. for Germany and in international comparison. The content of the social research seminars is determined individually by the lecturers. Students are free to choose one seminar each for Social Research A/B.

M 6.68 Module: Specialization in Customer Relationship Management [M-WIWI-101422]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	5

Mandatory			
T-WIWI-102597	Operative CRM	4,5 CR	Geyer-Schulz
Election block: Supplementary Courses (1 item)			
T-WIWI-102596	Analytical CRM	4,5 CR	Geyer-Schulz
T-WIWI-109938	Digital Services	4,5 CR	Satzger, Weinhardt
T-WIWI-100005	Competition in Networks	4,5 CR	Mitusch

Competence Certificate
This module will be offered for the last time in winter semester 2019/20.

The assessment is carried out as partial exams (according to Section 4(1), S. 2 2nd clause 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 the scientific methods (from business administration, statistics, informatics) which are most relevant for analytic CRM and he autonomously applies these methods to standard cases,
- gains an overview of the market for CRM software,
- designs, implements, and analyzes operative CRM processes in concrete application domains (e.g. campaign management, call center management, ...),
- is aware of the problems of protecting the privacy of customers and the implications of privacy law.

Prerequisites
The course "Operative CRM" is compulsory.

It is only possible to choose this module in combination with the module *CRM and Servicemanagement*. The module is passed only after the final partial exam of *CRM and Servicemanagement* is additionally passed.

Content
In this module, analysis methods and techniques for the management and improvement of customer relations are presented. Furthermore, modelling, implementation, introduction, change, analysis and valuation of operative CRM processes are treated. Regarding the first part, we teach analysis methods and techniques suitable for the management and improvement of customer relations. For this goal we treat the principles of customer- and service-oriented management as the foundation of successful customer relationship management. In addition, we show how knowledge of the customer can be used for decision-making at an aggregate level (e.g. planning of sortiments, analysis of customer loyality, ...). A basic requirement for this is the integration and collection of data from operative processes in a suitably defined data-warehouse in which all relevant data is kept for future analysis. The process of transfering data from the operative systems into the data warehouse is known as the ETL process (Extract / Transform / Load). The process of modelling a data-warehouse as well as the so-called extraction, transformation, and loading process for building and maintaining a data-warehouse are discussed in-depth. The data-warehouse serves as a base for flexible management reporting. In addition, various statistic methods (e.g. cluster analysis, regression analysis, stochastic models, ...) are presented which help in computing suitable key performance indicators or which support decision-making.
Regaring the operative part, we emphasize the design of operative CRM processes. This includes the modelling, implementation, introduction and change, as well as the analysis and evaluation of operative CRM processes. Petri nets and their extensions are the scientific foundation of process modelling. The link of Petri nets to process models used in industry as e.g. UML activity diagrams is presented. In addition, a framework for process innovation which aims at a radical improvement of key business processes is introduced. The following application areas of operative CRM processes are presented and discussed:
Strategic marketing processes
Operative marketing processes (campaign managament, permission marketing, ...)
Customer service processes (sales force management, field services, call center management, ...)

Workload
The total amount of work for this module is approximately 270 hours (9 credits). The subdivision is based on the credits of the courses of the module.
The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam periods and the time that is required to achieve the objectives of the module as an average student with an average performance.

M 6.69 Module: Specialization in Production Engineering [M-MACH-101284]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	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 6.70 Module: Statistics and Econometrics [M-WIWI-101599]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: Economics (Specialisation Program Economics)
Compulsory Elective Modules (Economics)
Compulsory Elective Modules (Statistics)

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	3

Election block: Compulsory Elective Courses (1 item)			
T-WIWI-102736	Economics III: Introduction in Econometrics	5 CR	Schienle
T-WIWI-106623	Technical Conditions Met	0 CR	
Election block: Supplementary Courses (between 1 and 2 items)			
T-WIWI-103063	Analysis of Multivariate Data	4,5 CR	Grothe
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
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 advanced understanding of Econometric techniques and statistical model building.
- is able to develop Econometric models for applied problems based on available data
- is able to apply techniques and models with statistical software, to interpret results and to judge on different approaches with appropriate statistical criteria.

Prerequisites
The course "Economics III: Introduction in Econometrics“ is compulsory and must be examined. In case the course „Economics III: Introduction in Econometrics“ has already been examined within the module „Applied Microeconomics“, the course „Economics III: Introduction in Econometrics“ is not compulsory.

Content
The courses provide a solid Econometric and statistical foundation of techiques necessary to conduct valid regression, time series and multivariate analysis.

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

M 6.71 Module: Strategy and Organization [M-WIWI-101425]

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

Credits	Recurrence	Language	Level	Version
9	Each term	German	3	4

Election block: Strategy and Organization (at least 9 credits)			
T-WIWI-102630	Managing Organizations	3,5 CR	Lindstädt
T-WIWI-102871	Problem Solving, Communication and Leadership	2 CR	Lindstädt
T-WIWI-102629	Management and Strategy	3,5 CR	Lindstädt

Competence Certificate
Erfolgreicher Abschluss aller fachlich entsprechenden Module aus dem Grundlagenprogramm.

Competence Goal

- The student describes both central concepts of strategic management as well as concepts and models for the design of organizational structures.
- He / she evaluates the strengths and weaknesses of existing organizational structures and regulations on the basis of systematic criteria.
- The management of organizational changes discusses and examines the students by means of case studies to what extent the models can be used in practice and what conditions must apply to them.
- In addition, students plan to use IT to support corporate governance.

Content
The module has a practical and action-oriented structure and provides the student with an up-to-date overview of basic skills concepts and models of strategic management and a realistic picture of possibilities and limitations rational design approaches of the organization.
The focus is firstly on internal and external strategic analysis, concept and sources of competitive advantage, Formulation of competitive and corporate strategies as well as strategy assessment and implementation. Secondly strengths and weaknesses of organizational structures and regulations are assessed on the basis of systematic criteria. Concepts for the organization of organizational structures, the regulation of organizational processes and the control organizational changes are presented.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.72 Module: Supply Chain Management [M-WIWI-101421]

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

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

Mandatory			
T-WIWI-109936	Platform Economy	4,5 CR	Dorner, Weinhardt
Election block: Supplementary Courses (1 item)			
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel

Competence Certificate
This module is only available in the elective field. In the specialization program Business Administration, the election is not permitted.

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 students

- are able to understand and evaluate the control of cross-company supply chains based on a strategic and operative view,
- are able to analyse the coordination problems within the supply chains,
- are able to identify and integrate adequate information system infrastructures to support the supply chains,
- are able to apply theoretical methods from the operations research and the information management,
- learn to elaborate solutions in a team

Prerequisites
The courseT-WIWI-107506 "Platform Economy"has to be taken.

Content
The module "Supply Chain Management" gives an overview of the mutual dependencies of information systems and of supply chains spanning several enterprises. The specifics of supply chains and their information needs set new requirements for the operational information management. In the core lecture "Platform Economy" the focus is set on markets between two parties that act through an intermediary on an Internet platform. Topics discussed are network effects, peer-to-peer markets, blockchains and market design. The course is held in English and teaches parts of the syllabus with the support of a case study in which students analyze a platform.

The module is completed by an elective course addressing appropriate optimization methods for the Supply Chain Management and for modern logistic approaches.

Annotation
The planned lectures in the next terms can be found on the websites of the respective institutes IISM, IFL and IOR.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.73 Module: Technical Logistics [M-MACH-101279]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Engineering Sciences)

Credits	Recurrence	Language	Level	Version
9	Each winter term	German	3	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 6.74 Module: Topics in Finance I [M-WIWI-101465]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

Credits	Recurrence	Duration	Language	Level	Version
9	Each term	1 semester	German/English	3	8

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-107505	Financial Accounting for Global Firms	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-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes

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 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

- has advanced skills in modern finance
- is able to apply these skills in practice in the fields of finance and accounting, financial markets and banking

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

In addition to that it is possible to choose the module *Topics in Finance II*.

Content
The module *Topics in Finance I* is based on the module *Essentials of Finance*. The courses deal with advanced issues concerning the fields of finance and accounting, financial markets and banking from a theoretical and practical point of view.

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

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 6.75 Module: Topics in Finance II [M-WIWI-101423]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Economics and Management

Part of: Business Administration (Specialisation Program Business Administration)
Compulsory Elective Modules (Business Administration oder Engineering Sciences)
Compulsory Elective Modules (Business Administration)

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

Election block: Compulsory Elective Courses (9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-110797	eFinance: Information Systems for Securities Trading	4,5 CR	Weinhardt
T-WIWI-102623	Financial Intermediation	4,5 CR	Ruckes
T-WIWI-107505	Financial Accounting for Global Firms	4,5 CR	Luedecke
T-WIWI-102626	Business Strategies of Banks	3 CR	Müller
T-WIWI-108711	Basics of German Company Tax Law and Tax Planning	4,5 CR	Gutekunst, Wigger
T-WIWI-102646	International Finance	3 CR	Uhrig-Homburg
T-WIWI-110511	Strategic Finance and Technoloy Change	1,5 CR	Ruckes

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 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

- has advanced skills in modern finance
- is able to apply these skills in practice in the fields of finance and accounting, financial markets and banking

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

In addition to that it is possible to choose the module *Topics in Finance I*.

Content
The module *Topics in Finance II* is based on the module *Essentials of Finance*. The courses deal with advanced issues concerning the fields of finance and accounting, financial markets and banking from a theoretical and practical point of view.

Annotation
The course T-WIWI-102790 "Special Taxation" will no longer be offered in the module as of winter semester 2018/1019.

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

M 6.76 Module: Vehicle Development [M-MACH-101265]

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

Part of: Engineering Sciences (Specialisation Program Engineering Sciences)
Compulsory Elective Modules (Business Administration oder 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.

7 Courses

T 7.1 Course: Advanced Lab Informatics (Master) [T-WIWI-110541]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - 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	2512204	Lab Business Information Systems: Realisation of innovative services (Bachelor)	3 SWS	Practical course (P)	Oberweis, Schiefer, Schüler, Toussaint
SS 2020	2512400	Development of Sociotechnical Information Systems (Bachelor)	3 SWS	Practical course (P)	Sunyaev, Sturm
SS 2020	2512402	Praktikum Blockchain und Distributed Ledger Technology (Bachelor)	SWS	Practical course (P)	Sunyaev, Beyene, Kannengießer, Pandl
SS 2020	2512554	Practical lab Security, Usability and Society (Bachelor)	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	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	7900016	Development of Sociotechnical Information Systems (Bachelor)		Prüfung (PR)	Sunyaev
SS 2020	7900029	Practical lab Security, Usability and Society (Bachelor)		Prüfung (PR)	Volkamer
SS 2020	7900085	Advanced Lab in Information Systems: Realization of innovative services (Bachelor)		Prüfung (PR)	Oberweis
SS 2020	7900096	Lab Blockchain and Distributed Ledger Technology (Bachelor)		Prüfung (PR)	Sunyaev

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

Practical course (P)

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

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 (Bachelor)

2512204, 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 **Development of Sociotechnical Information Systems (Bachelor)** **Practical course (P)**
2512400, SS 2020, 3 SWS, Language: German/English, Open in study portal

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 **Practical lab Security, Usability and Society (Bachelor)** **Practical course (P)**
2512554, SS 2020, 3 SWS, Language: English, Open in study portal

Content
The internship "Security, Usability and Society" will cover topics both of usable security and privacy programming, and how to conduct user studies. This internship will be only in English. The kick-off, the presentations, and every written material to be graded must be in English. Communications with supervisors can be in German.

Important dates:

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

Final submission : 8. September 2020, 23:59

Presentation : 28. September 2020, 14:00

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.

Topics:

- NoPhish 2.0
- Notes 2.0
- Sudoku 2.0

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.

Topics:

- Password Manager Enrollment Add-On
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- PassSec update
- TORPEDO - web service for different checks
- TORPEDO - Enabling to put identified phishing e-mails into the KIT-spam folder

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.

Topics:

- Investigating the Corona outbreak impact on privacy and security users' perception.
- Correlation between misconceptions about password security.
- Comparative analysis of several tutorials for TORPEDO.
- Investigating user reactions to Facebook behavioural data collection.
- Usability and adoption of password managers.

Please, note that registration is not required to participate in the kick-off meeting.

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 7.2 Course: Advanced Lab Security [T-WIWI-109786]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - 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 7.3 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-101426 - 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: 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. This internship will be only in English. The kick-off, the presentations, and every written material to be graded must be in English. Communications with supervisors can be in German.

Important dates:

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Topics:

- NoPhish 2.0
- Notes 2.0
- Sudoku 2.0

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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.

Topics:

- Password Manager Enrollment Add-On
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- PassSec update
- TORPEDO - web service for different checks
- TORPEDO - Enabling to put identified phishing e-mails into the KIT-spam folder

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.

Topics:

- Investigating the Corona outbreak impact on privacy and security users' perception.
- Correlation between misconceptions about password security.
- Comparative analysis of several tutorials for TORPEDO.
- Investigating user reactions to Facebook behavioural data collection.
- Usability and adoption of password managers.

Please, note that registration is not required to participate in the kick-off meeting.

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) .

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

T 7.4 Course: Advanced Programming - Application of Business Software [T-WIWI-102748]

Responsible: Prof. Dr. Stefan Klink
Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105112 - Applied Informatics

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2511026	Advanced Programming - Application of Business Software	2 SWS	Lecture (V)	Klink
WS 19/20	2511027	Exercises Advanced Programming - Application of Business Software	1 SWS	Practice (Ü)	Klink, Ullrich, Schreiber
WS 19/20	2511028	Computer lab Advanced Programming - Application of Business Software	2 SWS	Practice (Ü)	Ullrich, Schreiber
Exams					
WS 19/20	7900019	Advanced Programming - Application of Business Software		Prüfung (PR)	
SS 2020	7900049	Advanced Programming - Application of Business Software (Registration until 21 June 2020)		Prüfung (PR)	Klink

Competence Certificate
The success control takes place in the form of a written examination in the amount of 90 minutes. The examination is offered every semester and can be repeated at any regular examination date.

The prerequisite for taking the exam is successful participation in a computer lab. Attendance is compulsory for individual dates of the lab. More detailed information on participation in the exercises and labs will be announced in the first lecture hour and on the lecture homepage.

Admission can only be acquired in the winter semester and is valid indefinitely.

Prerequisites
This course cannot be taken together with *Advanced Programming - Java Network Programming*.

Recommendation
Knowledge of the course "Grundlagen der Informatik I und II" are helpful.

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

V Advanced Programming - Application of Business Software

2511026, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Business information systems enable, support, and accelerate new forms of business processes and forms of organisation. They are the central infrastucture of the economy in the age of eBusiness. Thus, basic knowledge is given in lectures, in excersises and in the computer lab which deals with installation, configuration and parameterization of busines information systems. The course communicates profund knowledge in following topics:

- Analysis of cooperation scenarios and business process scenarios
- Selection of modelling methods according to defined criteria
- Implementation of business process modells and cooperation modells with the help of standard software
- Identification and assessment of challenges during the installation of information systems
- Economical evaluation of business information systems.

This course cannot be taken together with *Advanced Programming - Java Network Programming* [2511020].

Learning objectives:

Students

- explain basic concepts and principles of enterprise information systems,
- describe the components of enterprise information systems,
- assess economical aspects of such systems,
- asseapply standard software for modelling busines processes and for analysing them to given criteria.

Recommendations:

Knowledge of the course "Grundlagen der Informatik I und II" are helpful.

Workload:

- Lecture 30h
- Exercise course 17h
- Review and preparation of lectures 23h
- Review and preparation of exercises 10h
- Computer Lab 30h
- Exam preparation 26h
- Exam 1h
- Total 150 h
- Exercise courses are done by student tutors (size about 50 students)

Literature

- Schönthaler, Vossen, Oberweis, Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.
- Hasenkamp, Stahlknecht: Einführung in die Wirtschaftsinformatik. Springer 2012.
- Hansen, Neumann: Wirtschaftsinformatik I. Grundlagen betrieblicher Informationsverarbeitung. UTB 2009.
- Mertens et al.: Grundzüge der Wirtschaftsinformatik. Springer 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.5 Course: Advanced Programming - Java Network Programming [T-WIWI-102747]

Responsible: Prof. Dr. Dietmar Ratz
Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105112 - Applied Informatics

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	3

Events					
SS 2020	2511020	Advanced Programming - Java Network Programming	2 SWS	Lecture (V)	Ratz
SS 2020	2511021	Tutorium zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	1 SWS	Tutorial (Tu)	Ratz, Struppek, Ulrich
SS 2020	2511023	Rechnerpraktikum zu Programmierung kommerzieller Systeme - Anwendungen in Netzen mit Java	2 SWS		Ratz, Struppek, Ulrich
Exams					
WS 19/20	7900020	Advanced Programming - Java Network Programming		Prüfung (PR)	
SS 2020	7900041	Advanced Programming - Java Network Programming (Registration until 05 July 2020)		Prüfung (PR)	Ratz

Competence Certificate
At the end of the lecture period, a written examination (90 min.) (according to§4(2), 1 SPO) will be held for which admission must be granted during the semester after successful participation in the practices. The exact details will be announced in the lecture.

The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
This course cannot be taken together with*Advanced Programming - Application of Business Software*[2511026].

Annotation
The registration for the participation in the computer lab (precondition for the exam participation) already takes place in the first lecture week!

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

V Advanced Programming - Java Network Programming

2511020, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
In the lecture, the exercises and computer labs to this course the practical handling with the programming language Java dominating within the range of economical applications is obtained. The basis for this is the current language standard. The knowledge from the lecture Introduction to Programming with Java will be deepened and extended. This is done, among other things, by addressing commercially relevant topics such as object-oriented modeling and programming, class hierarchy and inheritance, threads, applications and applets, AWT and Swing components for graphical user interfaces, exception and event processing, lambda expressions, input/output via streams, applications in networks, Internet communication, client and server programming, remote method invocation, servlets, Java Server Pages and Enterprise Java Beans.

This course cannot be taken together with *Advanced Programming - Application of Business Software* [2540886/2590886].

Learning objectives:

- Students learn the practical use of the object-oriented programming language Java and are enabled to design and implement component-based Internet applications using the latest technologies and tools.
- The ability to select and design these methods and systems appropriate to the situation and to use them for solving problems is imparted.
- Students are empowered to find strategic and creative answers in the search for solutions to well-defined, concrete and abstract problems.

Workload:

The total workload for this course is approximately 150 hours.

Literature
D. Ratz, J. Scheffler, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 6. aktualisierte und erweiterte Auflage, Hanser 2011.

Weiterführende Literatur:

- S. Zakhour, S. Hommel, J. Royal. Das Java Tutorial. Addison Wesley 2007
- W. Eberling, J. Lessner. Enterprise JavaBeans 3. Hanser Verlag 2007.
- R. Oechsle. Parallele und verteilte Anwendungen. 2. Auflage. Hanser Verlag 2007.
- Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.6 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-101501 - Economic Theory

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 7.7 Course: Agile Product Innovation Management - Value-driven Planning of New Products [T-MACH-106744]

Responsible: Dr.-Ing. Roland Kläger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	3

Competence Certificate
Oral examination, 20 min.

Prerequisites
None

T 7.8 Course: Analalysis of Social Structurs (WiWi) [T-GEISTSOZ-109047]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	5011007	Analysis of Social Structures	2 SWS	Practice (Ü)	Nollmann
Exams					
WS 19/20	7400029	Analalysis of Social Structurs (WiWi)		Prüfung (PR)	Nollmann

T 7.9 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 7.10 Course: Analysis of Multivariate Data [T-WIWI-103063]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics

Type	Credits	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
WS 19/20	2550550		2 SWS	Lecture (V)	Grothe
WS 19/20	2550551		2 SWS	Practice (Ü)	Grothe, N.N.
Exams					
WS 19/20	7900297	Analysis of Multivariate Data		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. The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Recommendation
Attendance of the courses Statistics 1 [2600008] and Statistics 2 [2610020] is recommended.

Annotation
The lecture is not offered regularly. The courses planned for three years in advance can be found online.

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

V 2550550, WS 19/20, 2 SWS, Open in study portal **Lecture (V)**

Literature
Skript zur Vorlesung

T 7.11 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 7.12 Course: Analytical CRM [T-WIWI-102596]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101422 - Specialization in Customer Relationship Management
M-WIWI-101460 - CRM and Service Management

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

Events					
SS 2020	2540522	Analytical CRM	2 SWS	Lecture (V)	Geyer-Schulz
SS 2020	2540523	Übungen zu Analytisches CRM	2 SWS	Practice (Ü)	Schweizer

Competence Certificate
The exam will be offered for first time writers for the last time 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
We expect knowledge about data models and the UML modelling language concerning information systems.

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

V Analytical CRM

2540522, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course Analytical CRM deals with methods and techniques for analysis concerning the management and improval of customer relationships. Knowledge about customers is aggregated and used for enterprise decision problems like product line planning, customer loyality, etc. A necessary precondition for these analyses is the transformation of data stemming from operative systems into a common data warehouse that assembles all necessary information. This requires transformation of data models and processes for creating and managing a data warehouse, like ETL processes, data quality and monitoring. The generation of customer oriented and flexible reports for different business purposes is covered. The course finally treats several different statistical analysis methods like clustering, regression etc. that are necessary for generating important indicators (like customer lifetime value, customer segmenatation). As external data source, customer surveys are introduced.

Learning objectives:

The Student

- understands the principal scientific methods from statistics and informatics used in analytical CRM and their application to enterprise decision problems and independently applies these methods to standard cases,
- understands the components for creating and managing a data warehouse from operative system sources including the processes and steps involved and applies these methods to a simple example, and
- uses his knowledge to conduct a standard CRM analysis on enterprise data for a busines decision problem and deduces and justifies a recommendation for appropriate action.

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.

The exam is passed, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 5) 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
Ponnia, Paulraj. Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals. Wiley, New York, 2001.

Duda, Richard O. und Hart, Peter E. und Stork, David G. Pattern Classification. Wiley-Interscience, New York, 2. Ausgabe, 2001.

Maddala, G. S. Introduction to Econometrics. Wiley, Chichester, 3rd Ed., 2001.

Theil, H. Principles of Econometrics. Wiley, New York, 1971.

T 7.13 Course: Applied Informatics – Applications of Artificial Intelligence [T-WIWI-110340]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

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

Events					
WS 19/20	2511314	Applications of Artificial Intelligence	2 SWS	Lecture (V)	Sure-Vetter
WS 19/20	2511315	Exercises to Applied Informatics – Applications of Artificial Intelligence	1 SWS	Practice (Ü)	Sure-Vetter, Weller
Exams					
WS 19/20	7900091	Applied Informatics - Applications of Artificial Intelligence		Prüfung (PR)	Sure-Vetter
SS 2020	7900009	Applied Informatics - Applications of AI (Registration until 13 July 2020)		Prüfung (PR)	Sure-Vetter

Competence Certificate
Written Examination (60 min) according to §4, Abs. 2, 1 of the examination regulations or oral examination of 20 minutes according to §4, Abs. 2, 2 of the examination regulations. The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Recommendation
Basics in logic, e.g. from lecture Foundations of Informatics 1 are important.

Annotation
Replaces from winter semester 2019/2020 T-WIWI-109263 "Applications of Artificial Intelligence".

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

V Applications of Artificial Intelligence
2511314, WS 19/20, 2 SWS, Language: German, Open in study portal **Lecture (V)**

Content
The lecture provides insights into the fundamentals of artificial intelligence. Basic methods of artificial intelligence and their applications in industry are presented.

Applications of the AI is a sub-area of computer science dealing with the automation of intelligent behavior. In general, it is a question of mapping human intelligence. Methods of artificial intelligence are presented in various areas such as, for example, question answering systems, speech recognition and image recognition.

The lecture gives an introduction to the basic concepts of artificial intelligence. Essential theoretical foundations, methods and their applications are presented and explained.

This lecture aims to provide students with a basic knowledge and understanding of the structure, analysis and application of selected methods and technologies on artificial intelligence. The topics include, among others, knowledge modeling, machine learning, text mining, uninformed search, and intelligent agents.

Learning objectives:

The students

- consider current research topics in the field of artificial intelligence and in particular learn about the topics of knowledge modeling, machine learning, text mining and uninformed search.
- interdisciplinary thinking.
- technological approaches to current 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

V

Exercises to Applied Informatics – Applications of Artificial Intelligence

2511315, WS 19/20, 1 SWS, Language: German, Open in study portal

Practice (Ü)

Content
The exercises are oriented on the lecture applications of AI.

Multiple exercises are held that capture the topics, held in the lecture Applications of AI and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

This lecture aims to provide students with a basic knowledge and understanding of the structure, analysis and application of selected methods and technologies on artificial intelligence. The topics include, among others, knowledge modeling, machine learning, text mining, uninformed search, and intelligent agents.

Learning objectives:

The students

- consider current research topics in the field of artificial intelligence and in particular learn about the topics of knowledge modeling, machine learning, text mining and uninformed search.
- interdisciplinary thinking.
- technological approaches to current problems.

T 7.14 Course: Applied Informatics – Database Systems [T-WIWI-110341]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

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

Events					
SS 2020	2511200	Applied Informatics - Database Systems	2 SWS	Lecture (V)	Sommer
SS 2020	2511201	Übungen zu Angewandte Informatik - Datenbanksysteme	1 SWS	Practice (Ü)	Sommer
Exams					
WS 19/20	7900006	Applied Informatics - Database Systems		Prüfung (PR)	Oberweis
SS 2020	7900037	Applied Informatics - Database Systems (Registration until 13 July 2020)		Prüfung (PR)	Oberweis

Competence Certificate
The assessment consists of a written exam (60 minutes) in the first week after lecture period.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102660 - Database Systems must not have been started.

Annotation
Replaces from summer semester 2020 T-WIWI-102660 "Database Systems".

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

V Applied Informatics - Database Systems

2511200, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Database systems (DBS) play an important role in today's companies. Internal and external data is stored and processed in databases in every company. The proper management and organization of data helps to solve many problems, enables simultaneous queries from multiple users and is the organizational and operational base for the entire working procedures and processes of the company. The lecture leads in the area of the database theory, covers the basics of database languages and database systems, considers basic concepts of object-oriented and XML databases, conveys the principles of multi-user control of databases and physical data organization. In addition, it gives an overview of business problems often encountered in practice such as:

- Correctness of data (operational, semantic integrity)
- Restore of a consistent database state
- Synchronization of parallel transactions (phantom problem).

Learning objectives:

Students

- are familiar with the concepts and principles of data base models, languages and systems and their applications and explain it,
- design and model relational data bases on the basis of theoretical foundations,
- create queries for relational databases,
- know how to handle enhanced data base problems occurring in the enterprises.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- Schlageter, Stucky. Datenbanksysteme: Konzepte und Modelle. Teubner 1983.
- S. M. Lang, P. C. Lockemann. Datenbankeinsatz. Springer-Verlag 1995.
- Jim Gray, Andreas Reuter. Transaction Processing: Concepts and Techniques. Morgan Kaufmann 1993.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

V

Übungen zu Angewandte Informatik - Datenbanksysteme

2511201, SS 2020, 1 SWS, Language: German, Open in study portal

Practice (Ü)

Content
Database systems (DBS) play an enormously important role in today's companies. The internal and external data is stored and processed in the database of the respective company. The correct management and organization of this data helps to solve numerous problems, enables simultaneous queries by several users and is the organizational and operational basis for the entire workflows and processes of the company.

The lecture introduces the field of database theory, covers the basics of database languages and database systems, teaches the principles of multi-user database control and physical data organization. In addition, it provides an overview of database problems often encountered in business practice, such as the correctness of data (operational, semantic integrity), the recovery of a consistent database state, and the synchronization of parallel transactions.

Literature
Schlageter / Stucky: Datenbanksysteme: Konzepte und Modelle, 2. Auflage, Teubner, Stuttgart, 1983 P. C. Lockemann / J. W. Schmidt (Hrsg.): Datenbank-Handbuch, Springer-Verlag, 1987 S. Cannan / G. Otten: SQL - The Standard Handbook, McGraw-Hill, 1993 Jim Gray / Andreas Reuter: Transaction Processing: Concepts and Techniques, Morgan Kaufmann, 1993 S. M. Lang / P. C. Lockemann: Datenbankeinsatz, Springer-Verlag, 1995 Ramez Elmasri / Shamkant B. Navathe: Fundamentals of Database Systems, Addison-Wesley, 1994 und 2000

T 7.15 Course: Applied Informatics – Information Security [T-WIWI-110342]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	2

Events					
SS 2020	2511550	Applied Informatics - Information Security	2 SWS	Lecture (V)	Volkamer
SS 2020	2511551	Exercise Applied Informatics - Information Security	1 SWS	Practice (Ü)	Volkamer, Reinheimer
Exams					
WS 19/20	7900074	Applied Informatics - Information Security		Prüfung (PR)	Volkamer
SS 2020	7900064	Applied Informatics - Information Security (Registration until 13 July 2020)		Prüfung (PR)	Volkamer

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-108387 - Information Security must not have been started.

Annotation
Replaces from summer term 2020 T-WIWI-108387 "Information Security".

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

V Applied Informatics - Information Security

2511550, SS 2020, 2 SWS, Open in study portal **Lecture (V)**

Content

- Basics and concepts of information security
- Understanding the protection objectives of information security and various attack models (including associated assumptions)
- introduction of measures to achieve the respective protection goals, taking into account different attack models
- Note: In contrast to the IT Security lecture, measures such as encryption algorithms are treated only abstractly, i. e. the idea of the measure, assumptions to the attacker and the deployment environment.
- Presentation and analysis of problems of information security arising from human-machine interaction and presentation of the Human Centered Security by Design approach.
- Introduction into organisational protective measures and standards to be observed for companies

Learing objectives:

The student

- can explain the basics of information security
- knows suitable measures to achieve different protection goals
- can assess the quality of organisational protective measures, i. e. among other things knows what has to be taken into account when using the individual measures
- understands the differences between information security in the organisational and in the private context
- knows the areas of application of different standards and knows their weaknesses
- knows and can explain the problems of information security that which arise from human-machine interaction
- is able to deal with messages concerning found security problems in a critical way.

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).

Literature

- P. Gerber, M. Ghiglieri, B. Henhapl, O. Kulyk, K. Marky, P. Mayer, B. Reinheimer, and M. Volkamer, *Human Factors in Security*. Springer, Jan. 2018, pp. 83–98.
- C. Eckert, *IT-Sicherheit: Konzepte-Verfahren-Protokolle*. Walter de Gruyter, 2013

V

Exercise Applied Informatics - Information Security

2511551, SS 2020, 1 SWS, Open in study portal

Practice (Ü)

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).

T 7.16 Course: Applied Informatics – Modelling [T-WIWI-110338]

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. York Sure-Vetter

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

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

Events					
WS 19/20	2511030	Applied Informatics - Modelling	2 SWS	Lecture (V)	Oberweis, Sure-Vetter, Schiefer
WS 19/20	2511031	Exercises to Applied Informatics - Modelling	1 SWS	Practice (Ü)	Oberweis, Sure-Vetter, Schiefer, Käfer
Exams					
WS 19/20	7900003	Applied Informatics - Modelling		Prüfung (PR)	Oberweis, Sure-Vetter
SS 2020	7900018	Applied Informatics - Modelling (Registration until 13 July 2020)		Prüfung (PR)	Oberweis, Sure-Vetter

Competence Certificate
The assessment consists of a written examination (60 min) in the first week after lecture period (according to Section 4 (2),1 of the examination regulation).

Prerequisites
None

Annotation
Replaces from winter semester 2019/2020 T-WIWI-102652 "Applied Informatics I - Modeling".

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

V Applied Informatics - Modelling

2511030, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
In the context of complex information systems, modelling is of central importance, e.g. – in the context of systems to be developed – for a better understanding of their functionality or in the context of existing systems for supporting maintenance and further development.

Modelling, in particular modelling of information systems, forms the core part of this lecture. The lecture is organized in two parts. The first part mainly covers the modelling of static aspectes, the second part covers the modelling of dynamic aspects of information systems.

The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and description logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets together with their respective analysis techniques will be introduced.

Learning objectives:

Students

- explain the strengths and weaknesses of various modeling approachesfor Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- model given problems in Description Logics and apply description logic rules,
- describe the main ontology concepts and languages and explain SPARQL queries,
- create and evaluate a relational database schema and express queries in relational algebra.

Workload:

- Total effort: 120-150 hours
- Presence time: 45 hours
- Self study: 75-105 hours

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

Weiterführende Literatur:

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- Staab, Studer: Handbook on Ontologies, Springer, 2003
- J.L. Peterson: Petri Net Theory and Modeling of Systems, Prentice Hall, 1981.
- Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi, Peter Patel-Schneider. The Description Logic Handbook - Theory, Implementation and Applications, Cambridge 2003.

V Exercises to Applied Informatics - Modelling

2511031, WS 19/20, 1 SWS, Language: German, Open in study portal

Practice (Ü)

Content
The exercises are related to the lecture Applied Informatics I - Modelling.

Multiple exercises are held that capture the topics, held in the lectureApplied Informatics I - Modelling, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

The lecture sets out with a definition of modelling and the advantages of modelling. After that, advanced aspects of UML, the Entity Relationship model (ER model) and description logics as a means of modelling static aspects will be explained. This will be complemented by the relational data model and the systematic design of databases based on ER models. For modelling dynamic aspects, different types of petri-nets together with their respective analysis techniques will be introduced.

Learning objectives:

Students

- explain the strengths and weaknesses of various modeling approaches for Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- model given problems in Description Logics and apply description logic rules,
- describe the main ontology concepts and languages and explain SPARQL queries,
- create and evaluate a relational database schema and express queries in relational algebra.

Literature

- Bernhard Rumpe. Modellierung mit UML, Springer-Verlag, 2004.
- R. Elmasri, S. B. Navathe. Fundamentals of Database Systems. Pearson Education 2009.
- W. Reisig. Petrinetze, Springer-Verlag, 2010.

Weiterführende Literatur:

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- Staab, Studer: Handbook on Ontologies, Springer, 2003
- J.L. Peterson: Petri Net Theory and Modeling of Systems, Prentice Hall, 1981.
- Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi, Peter Patel-Schneider. The Description Logic Handbook - Theory, Implementation and Applications, Cambridge 2003.

T 7.17 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-101426 - Electives in Informatics
M-WIWI-105112 - Applied 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 7.18 Course: Applied Informatics – Software Engineering [T-WIWI-110343]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics
M-WIWI-105112 - Applied Informatics

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

Events					
SS 2020	2511206	Applied Informatics - Software Engineering	2 SWS	Lecture (V)	Oberweis
SS 2020	2511207	Übungen zu Angewandte Informatik - Software Engineering	1 SWS	Practice (Ü)	Oberweis, Fritsch
Exams					
WS 19/20	7900026	Applied Informatics - Software Engineering		Prüfung (PR)	Oberweis
SS 2020	7900027	Applied Informatics - Software Engineering (Registration until 13 July 2020)		Prüfung (PR)	Oberweis

Competence Certificate
The assessment consists of an 1h written exam in the first week after lecture period.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-100809 - Software Engineering must not have been started.

Annotation
Replaces T-WIWI-100809 "Software Engineering" as of summer semester 2020.

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

V Applied Informatics - Software Engineering

2511206, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course deals with fundamental aspects of the systematically development of huge software systems. The course covers topics such as:

- software developing process models
- methods and tools for the development phases: requirements analysis, system specification, system design, programming and testing.

Learning objectives:

Students

- are familiar with the concepts and principles of software engineering and can discuss it,
- know common software development process models and their strengths and weaknesses and can discuss it,
- know methods for requirements analysis and can use it and can model and evaluate use case models,
- know models for systems structuring and controling as well as architecture principles of software systems and can discuss it.
- can model and evaluate component diagrams
- are familiar with basic concepts of software quality management and are able to apply software test and evaluation methods in concrete situations.

Workload:

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h

Literature

- H. Balzert. Lehrbuch der Software-Technik. Spektrum Verlag 2008.
- I. Sommerville. Software Engineering. Pearson Studium 2012.

Weitere Literatur wird in der Vorlesung bekannt gegeben.

T 7.19 Course: Auction & Mechanism Design [T-WIWI-102876]

Responsible: Prof. Dr. Nora Szech
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

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

Events					
SS 2020	2560550	Auction and Mechanism Design	2 SWS	Lecture (V)	Szech
SS 2020	2560551	Übung zu Auction and Mechanism Design	1 SWS	Practice (Ü)	Szech, Huber

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.

A bonus can be earned through successful participation in the excercise. 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
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Annotation
The lecture will be held in English.

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

V Auction and Mechanism Design

2560550, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The course starts with the basic theory of equilibrium behavior and revenue management in one object standard auctions. The revenue equivalence theorem for standard auctions is introduced. Thereafter, the course focuses on mechanism design and its applications to one object auctions and bilateral trade.

The students

- learn to analyze strategic behavior in auctions;
- learn to compare auction formats with regard to efficiency and revenue;
- are familiarized with the basic theory of (Bayesian) mechanism design;
- learn to master the revenue equivalence theorem for standard auctions;
- learn to apply mechanism design to one object auctions and bilateral trade.

The lecture will be held in English.

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.

Through successful participation in the Exercise, students can earn a bonus. If the grade on the written exam is between 4,0 and 1,3 the bonus improves the grade by one step (0,3 or 0,4). Details will be announced during the lecture.

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

Recommendations:

Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Literature
Krishna, V.: Auction Theory, Academic Press, 2009.

Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2010.

Mathews, S.: A Technical Primer on Auction Theory I: Independent Private Values No. 1096. Northwestern University, Center for Mathematical Studies in Economics and Management Science, 1995.

T 7.20 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 7.21 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 7.22 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 7.23 Course: Bachelor Thesis [T-WIWI-103067]

Responsible: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101601 - Module Bachelor Thesis

Type	Credits	Version
Final Thesis	12	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	1 months
Correction period	6 weeks

T 7.24 Course: Basic Principles of Economic Policy [T-WIWI-103213]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101668 - Economic Policy I

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

Events					
SS 2020	2560280	Basic Principles of Economic Policy	2 SWS	Lecture (V)	Ott
SS 2020	2560281	Exercises of Basic Principles of Economic Policy	1 SWS	Practice (Ü)	Ott, Scheu, Bälz

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.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2610012], and Economics II [2600014].

Annotation
Description:

Theory of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:

Students learn:

- To apply basic concepts of micro- and macroeconomic theories to economic policy issues.
- to develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- to derive theory-based policy recommendations.

Learning content:

- Market interventions: microeconomic perspective
- Market interventions: macroeconomic perspective
- Institutional economic aspects
- Economic policy and welfare economics
- Economic policy makers: Political-economic aspects

Workload:

- Total effort at 4.5 LP: approx. 135 hours
- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Media:

See course announcement

References:

See course announcement

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

V Basic Principles of Economic Policy

2560280, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The lecture deals with theories of general economic policy and discussion of current economic policy topics:

- Goals of economic policy,
- Instruments and institutions of economic policy,
- Triad of regional, national and European economic policies,
- special fields of economic policy, in particular growth, employment, provision of public infrastructure and climate policy.

Learning objectives:

Students shall be given the ability to

- apply basic concepts of micro- and macroeconomic theories to economic policy issues
- develop arguments on how state intervention in the market can be legitimized from a welfare economic perspective
- derive theory-based policy recommendations

Recommendations:

Basic micro- and macroeconomic knowledge is required, especially as taught in the courses Economics I [2610012] and Economics II [2600014].

Workload:

Total effort at 4.5 LP is approx. 135 hours and consists of:

- Presence time: approx. 30 hours
- Self-study: approx. 105 hours

Assessment:

The examination takes place in the form of a written examination (60min) (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

Literature

- Klump, Rainer (2013): Wirtschaftspolitik. Pearson Studium
- Baldwin, Richard und Charles Wyplosz (2019): The Economics of European Integration, 6. Edition, McGraw-Hill Education, London
- Foliensatz zur Vorlesung
- Übungsaufgaben

V Exercises of Basic Principles of Economic Policy

2560281, SS 2020, 1 SWS, Language: German, Open in study portal

Practice (Ü)

Literature

- Klump, Rainer (2013): Wirtschaftspolitik. Pearson Studium
- Baldwin, Richard und Charles Wyplosz (2019): The Economics of European Integration, 6. Edition, McGraw-Hill Education, London
- Foliensatz zur Vorlesung
- Übungsaufgaben

T 7.25 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-101403 - Public Finance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

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 7.26 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 7.27 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 7.28 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

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 7.29 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

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 7.30 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

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

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

Literature
Folien und Literatur werden in ILIAS zur Verfügung gestellt.

T 7.31 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 7.32 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 7.33 Course: Business Administration: Finance and Accounting [T-WIWI-102819]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Prof. Dr. Marcus Wouters

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101494 - Fundamentals of Business Administration 1

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2610026	Business Administration: Finance and Accounting	2 SWS	Lecture (V)	Ruckes, Wouters
WS 19/20	2610027		2 SWS	Tutorial (Tu)	Strych
WS 19/20	2610029		2 SWS	Tutorial (Tu)	Strych
Exams					
WS 19/20	7900305	Business Administration: Finance and Accounting		Prüfung (PR)	Ruckes, Wouters

Competence Certificate
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation.

The assessment 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 Business Administration: Finance and Accounting

2610026, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Ausführliche Literaturhinweise werden in den Materialen zur Vorlesung gegeben.

T 7.34 Course: Business Administration: Production Economics and Marketing [T-WIWI-102818]

Responsible: Prof. Dr. Wolf Fichtner
Prof. Dr. Martin Klarmann
Prof. Dr.-Ing. Thomas Lützkendorf
Prof. Dr. Martin Ruckes
Prof. Dr. Frank Schultmann

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101578 - Fundamentals of Business Administration 2

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2020	2500025	Tutorien zu BWL PM	2 SWS	Tutorial (Tu)	Klarmann, Strych, Assistenten
SS 2020	2600024	Business Administration: Production Economics and Marketing	2 SWS	Lecture (V)	Klarmann, Schultmann
Exams					
WS 19/20	7900246	Business Administration: Production Economics and Marketing		Prüfung (PR)	Klarmann, Schultmann

Competence Certificate
The assessment consists of a written exam (90 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 Business Administration: Production Economics and Marketing

2600024, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course is composed of the sub-areas:

1. Marketing:

Marketing aims at the optimal design of situations that arise in the context of economic activity in the satisfaction of needs and desires (e.g. marketing of company services, soliciting understanding of group interests, distribution of public funds, implementation of economic policy goals).

Topics dealt with in detail:

- Market research (e.g. product positioning, market segmentation)
- behavioural research (e.g. influence of socio-cultural and physical environmental aspects)
- Marketing policy instruments (e.g. product, price, communication and distribution policy),
- Special features of international marketing activities (e.g. advantages and risks in international exchange relations),
- Entrepreneurship and intrapreneurship (e.g. marketing of innovations by company founders vs. established companies)

2. Production Economy:

This subfield provides an initial introduction to all operational tasks related to the production of tangible and intangible goods. In addition to the manufacturing industry (basic and capital goods, capital goods and consumer goods, food and beverages, i.e. production industry in the broadest sense), the energy industry, construction and real estate industry and labour sciences are also considered.

Topics dealt with in detail:

- Introduction to the subfield (system theoretical classification, general tasks, cross-sectional topics)
- Industrial production (location planning, transport planning, procurement, plant management, production management)
- Electricity industry (energy demand and supply, energy system planning, technological foresight, cost structures)
- Construction and real estate industry

3. Information Systems:

Information represents a competitive factor in today's economy, which requires an interdisciplinary view of the research fields of economics, information technology and law. In this subfield, selected fundamentals of Business Information Systems and their role in today's competition are presented.
Examples from practice motivate and complement the topics.

Treated topics in detail:

- Trends in Information Systems
- Definition of terms data, information, knowledge
- Information in companies: Production and competitive factor
- Information processing: from agent to corporate network
- Company networks
- Service Value Networks
- market engineering
- social networks and services

Literature
Ausführliche Literaturhinweise werden gegeben in den Materialen zur Vorlesung.

T 7.35 Course: Business Administration: Strategic Management and Information Engineering and Management [T-WIWI-102817]

Responsible: Prof. Dr. Petra Nieken
Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101494 - Fundamentals of Business Administration 1

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2600023	Betriebswirtschaftslehre: Unternehmensführung und Informationswirtschaft	2 SWS	Lecture (V)	Weinhardt, Strych, Nieken
Exams					
WS 19/20	7900306	Business Administration: Strategic Management and Information Engineering and Management		Prüfung (PR)	Weinhardt, Nieken

Competence Certificate
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation.
The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

T 7.36 Course: Business Strategies of Banks [T-WIWI-102626]

Responsible: Prof. Dr. Wolfgang Müller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

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 7.37 Course: CAD-NX Training Course [T-MACH-102187]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Recurrence	Version
Completed coursework (practical)	2	Each term	2

Events					
WS 19/20	2123357	CAD-NX training course	2 SWS	Practical course (P)	Ovtcharova, Mitarbeiter
SS 2020	2123357	CAD-NX training course	2 SWS	Practical course (P)	Ovtcharova, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-102187	CAD-NX 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 compulsory attendance exists.

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

V CAD-NX training course

2123357, WS 19/20, 2 SWS, Language: German, Open in study portal — **Practical course (P)**

Content

- Overview of the functional range
- Introduction to the work environment of NX
- Basics of 3D-CAD modelling
- Feature-based modelling
- Freeform modelling
- Generation of technical drawings
- Assembly modelling
- Finite element method (FEM) and multi-body simulation (MBS) with NX

Students are able to:

- create their own 3D geometric models in the CAD system NX 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 NX to automate the creation of geometry and thus to ensure the reusability of the models.

Literature
Praktikumsskript

V

CAD-NX training course

2123357, SS 2020, 2 SWS, Language: German, Open in study portal

Practical course (P)

Content

- Overview of the functional range
- Introduction to the work environment of NX
- Basics of 3D-CAD modelling
- Feature-based modelling
- Freeform modelling
- Generation of technical drawings
- Assembly modelling
- Finite element method (FEM) and multi-body simulation (MBS) with NX

Students are able to:

- create their own 3D geometric models in the CAD system NX 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 NX to automate the creation of geometry and thus to ensure the reusability of the models.

Literature
Praktikumsskript

T 7.38 Course: Civil Law for Beginners [T-INFO-103339]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-105084 - Public and Civil Law

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	3

Events					
WS 19/20	24012	Civil Law for Beginners	4 SWS	Lecture (V)	Matz
Exams					
WS 19/20	7500012	Civil Law for Beginners		Prüfung (PR)	Matz, Dreier
SS 2020	7500041	Civil Law for Beginners		Prüfung (PR)	Dreier, Matz

T 7.39 Course: Climatology [T-PHYS-101092]

Responsible: Prof. Dr. Joaquim José Ginete Werner Pinto
Katharina Maurer

Organisation: KIT Department of Physics

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Completed coursework	5	Each summer term	3

Events					
SS 2020	4051111	Klimatologie	3 SWS	Lecture (V)	Ginete Werner Pinto
SS 2020	4051112	Übungen zu Klimatologie	1 SWS	Practice (Ü)	Ginete Werner Pinto, Ludwig, Mömken

Prerequisites
none

T 7.40 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 7.41 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 7.42 Course: Competition in Networks [T-WIWI-100005]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101422 - Specialization in Customer Relationship Management
M-WIWI-101499 - Applied Microeconomics
M-WIWI-101668 - Economic Policy I

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 7.43 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-101262 - Emphasis 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 7.44 Course: Construction Technology [T-BGU-101691]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-101004 - Fundamentals of Construction

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2020	6200410	Construction Technology	3 SWS	Lecture (V)	Gentes, Haghsheno, Schneider
SS 2020	6200411	Exercises to Construction Technology	1 SWS	Practice (Ü)	Gentes, Haghsheno, Schneider, Waleczko
Exams					
WS 19/20	8230101691	Construction Technology		Prüfung (PR)	Haghsheno, Gentes, Schneider

Competence Certificate
written exam with 90 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.45 Course: Consumer Behavior [T-WIWI-106569]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104911 - Information Systems & Digital Business: Interaction

Type	Credits	Recurrence	Version
Written examination	4,5	Once	2

Events					
SS 2020	2572174	Consumer Behavior	3 SWS	Lecture (V)	Scheibehenne
SS 2020	2572176	Übung zu Consumer Behavior	1 SWS	Practice (Ü)	Scheibehenne, Oberholzer

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 the research group Marketing and Sales (http://marketing.iism.kit.edu/).

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

V Consumer Behavior

2572174, SS 2020, 3 SWS, Language: English, Open in study portal

Lecture (V)

Content
Goal

The goal of the class is to gain a better understanding of the situational, biological, cognitive, and evolutionary factors that drive consumer behavior. We will address these questions from an interdisciplinary perspective, including relevant theories and empirical research findings from Psychology, Marketing, Cognitive Science, Biology, and Economics.

Description

Consumer decisions are ubiquitous in daily life and they can have long-ranging and important consequences for individual (financial) well-being and health but also for societies and the planet as a whole. To help people making better choices it is important to understand the factors that influence their behavior. Towards this goal, we will explore how consumer behavior is shaped by social influences, situational and cognitive constraints, as well as by emotions, motivations, evolutionary forces, neuronal processes, and individual differences. Across all topics covered in class, we will engage with basic theoretical work as well as with groundbreaking empirical research and current scientific debates.

The lecture will be held in English.

Grading

There will be a written exam at the last day of class. The exam will cover the content of the lecture and the literature listed in the required reading list that will be made available to enrolled students on the first day of class. The the exam questions will be in English. You are allowed to bring a language dictionary into the exam but you are not allowed to bring notes.

Workload

The total workload for this course is approximately 135 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45 hours

Exam and exam preparation: 60 hours

Comment

This lecture features a “double down” format: There will be two lecture sessions in a row during the first half of the semester. Thus, you will be finished with this class after 7 weeks.

Literature
Will be made available to enrolled students on the first day of class.

T 7.46 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
SS 2020	76-T-MACH-105185	Control Technology		Prüfung (PR)	Fleischer

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 7.47 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-101816 - 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 7.48 Course: Customer Relationship Management [T-WIWI-102595]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101460 - CRM and Service Management

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

Events					
WS 19/20	2540508	Customer Relationship Management	2 SWS	Lecture (V)	Geyer-Schulz
WS 19/20	2540509	Übung zu Customer Relationship Management	1 SWS	Practice (Ü)	Schweigert
Exams					
WS 19/20	7979242	Customer Relationship Management		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

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

V Customer Relationship Management

2540508, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Literature
Christian Grönroos. Service Management and Marketing : A Customer Relationship Management Approach. Wiley, Chichester, 2nd edition, 2000.

Weiterführende Literatur:

Jill Dyché. The CRM Handbook: A Business Guide to Customer Relationship Management. Addison-Wesley, Boston, 2nd edition, 2002.

Ronald S. Swift. Accelerating Customer Relationships: Using CRM and RelationshipTechnologies. Prentice Hall, Upper Saddle River, 2001.

Stanley A. Brown. Customer Relationship Management: A Strategic Imperative in theWorld of E-Business. John Wiley, Toronto, 2000.

T 7.49 Course: Data Mining and Applications [T-WIWI-103066]

Responsible: Rheza Nakhaeizadeh
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics

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 7.50 Course: Decision Theory [T-WIWI-102792]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics

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

Exams				
WS 19/20	7900291	Decision 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

Recommendation
Knowledge in mathematics and statistics is required.

T 7.51 Course: Derivatives [T-WIWI-102643]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

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 7.52 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 7.53 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 7.54 Course: Design and Operation of Power Transformers [T-ETIT-101925]

Responsible: Prof. Dr.-Ing. Thomas Leibfried
Michael Schäfer

Organisation: KIT Department of Electrical Engineering and Information Technology

Part of: M-ETIT-101165 - Energy Generation and Network Components

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	1

Events					
SS 2020	2307390	Design and Operation of Power Transformers	2 SWS	Block (B)	Schäfer, Rink

T 7.55 Course: Design, Construction and Sustainability Assessment of Buildings I [T-WIWI-102742]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

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

Events					
WS 19/20	2586404	Design and Construction of Buildings	2 SWS	Lecture (V)	Lützkendorf
WS 19/20	2586405	Übung zu Bauökologie I	1 SWS	Practice (Ü)	Worschech, Jungmann
Exams					
WS 19/20	7900247	Design, Construction and Sustainability Assessment of Buildings I		Prüfung (PR)	Lützkendorf
WS 19/20	7900248	Design, Construction and Sustainability Assessment of Buildings I		Prüfung (PR)	Lützkendorf

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
A combination with the module *Real Estate Management* and with engineering science modules in the area of building physics and structural design is recommended.

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

V Design and Construction of Buildings

2586404, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Taking low-energy buildings as an example the course is an introduction to cheap, energy-efficient, resource-saving and health-supporting design, construction and operation of buildings. Questions of the implementation of the principles of a sustainable development within the building sector are discussed on the levels of the whole building, its components, building equipment as well as the materials. Besides technical interrelationships basics dimensioning and various approaches to ecological and economical assessment play a role during the lectures, as well as the different roles of people involved into the building process. Topics are the integration of economical and ecological aspects into the design process, strategies of energy supply, low-energy and passive buildings, active and passive use of solar energy, selection and assessment of construction details, selection and assessment of insulation materials, greened roofs plus health and comfort.

Recommendations:

A combination with the module *Real Estate Management* [WW3BWLUO1] and with engineering science modules in the area of building physics and structural design is recommended.

The student

- has an in-depth knowledge of aspects of energy-saving, resource-saving and health-oriented design, construction and operation of buildings (design for environment)
- has a critical understanding of the essential requirements, concepts and technical solutions for green buildings
- is able to integrate aspects of energy-saving, resource-saving and health-conscious construction into a holistic environmental design approach and to assess the advantages and disadvantages of different individual solutions.

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

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Umweltbundesamt (Hrsg.): "Leitfaden zum ökologisch orientierten Bauen". C.F.Müller 1997
- IBO (Hrsg.): "Ökologie der Dämmstoffe". Springer 2000
- Feist (Hrsg.): "Das Niedrigenergiehaus – Standard für energiebewusstes Bauen". C.F.Müller 1998
- Bundesarchitektenkammer (Hrsg.): "Energiegerechtes Bauen und Modernisieren". Birkhäuser 1996
- Schulze-Darup: "Bauökologie". Bauverlag 1996

T 7.56 Course: Design, Construction and Sustainability Assessment of Buildings II [T-WIWI-102743]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

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

Events					
SS 2020	2585403	Übung zu Bauökologie II	1 SWS	Practice (Ü)	Jungmann
SS 2020	2585404	Sustainability Assessment of Buildings	2 SWS	Lecture (V)	Lützkendorf

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
A combination with the module *Real Estate Management* and with engineering science modules from the areas building physics and structural designis recommended.

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

V Sustainability Assessment of Buildings

2585404, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course identifies problems concerning the economical and environmental assessment of buildings along their lifecycle and discusses suitable procedures and tools supporting the decision making process. For example, the course addresses topics like operating costs, heat cost allocation, comparisons of heating costs, applied economical assessment methods, life cycle assessment as well as related design and assessment tools (e.g. element catalogues, databases, emblems, tools) and assessment procedures (e.g. carbon footprint, MIPS, KEA), which are currently available.

Recommendations:

A combination with the module *Real Estate Management* [WW3BWLOOW2] and with engineering science modules from the areas building physics and structural designis recommended.

The student

- has an in-depth knowledge of the classification of environmental design and construction of buildings within the overall context of sustainability
- has a critical understanding of the main theories and methods of assessing the environmental performance of buildings
- is able to use methods and tools to evaluate the environmental performance in design and decision processes or to interpret existing results

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

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Re-examinations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Schmidt-Bleek: "Das MIPS-Konzept". Droemer 1998
- Wackernagel et.al: "Unser ökologischer Fußabdruck". Birkhäuser 1997
- Braunschweig: "Methode der ökologischen Knappheit". BUWAL 1997
- Hohmeyer et al.: "Social Costs and Sustainability". Springer 1997
- Hofstetter: "Perspectives in Life Cycle Impact Assessment". Kluwer Academic Publishers 1998

T 7.57 Course: Digital Services [T-WIWI-109938]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101422 - Specialization in Customer Relationship Management
M-WIWI-101434 - eBusiness and Service Management
M-WIWI-102752 - Fundamentals of Digital Service Systems
M-WIWI-104912 - Information Systems & Digital Business: Platforms
M-WIWI-104913 - Information Systems & Digital Business: Servitization

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

Events					
SS 2020	2595466	Digital Services	2 SWS	Lecture (V)	Satzger, Weinhardt, Kühl
SS 2020	2595467	Exercise Digital Services	1 SWS	Practice (Ü)	Kühl, Schöffer, Badewitz
Exams					
WS 19/20	7900232	Digital Services		Prüfung (PR)	Satzger

Competence Certificate
The assessment consists of a written exam (60 min) (§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
see below

Annotation
This course replaces T-WIWI-105771 "Foundations of Digital Services A" as of winter semester 2019/2020.

Students who wish to register for the examination in the summer semester 2019 please select the examination "Foundations of Digital Services A".

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

V Digital Services

2595466, SS 2020, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
The world is moving more and more towards “service-led” economies: in developed countries services already account for around 70% of gross value added. In order to design, engineer, and manage services, traditional “goods-oriented” models are often inappropriate. In addition, the rapid development of information and communication technology (ICT) pushes the economic importance of services that are rendered electronically (eServices) and, thus, drives competitive changes: increased interaction and individualization open up new dimensions of “value co-creation” between providers and customers; dynamic and scalable service value networks replace static value chains; digital services can be globally delivered and exchanged across today’s geographic boundaries. Building on a systematic categorization of (e)Services and on the general notion of “value co-creation”, we cover concepts and foundations for engineering and managing IT-based services, allowing for further specialization in subsequent KSRI courses. Topics include service innovation, service economics, service modeling as well as the transformation and coordination of service value networks. In addition, case studies, hands-on exercises and guest lectures will illustrate the applicability of the concepts. English language is used throughout the course to acquaint students with international environments.

Literature

- Anderson, J./ Nirmalya, K. / Narus, J. (2007), Value Merchants.
- Lovelock, C. / Wirtz, J. (2007) Services Marketing, 6th ed.
- Meffert, H./Bruhn, M. (2006), Dienstleistungsmarketing, 5. Auflage,
- Spohrer, J. et al. (2007), Steps towards a science of service systems. In: IEEE Computer, 40 (1), p. 70-77
- Stauss, B. et al. (Hrsg.) (2007), Service Science – Fundamentals Challenges and Future Developments.
- Teboul, (2007), Services is Front Stage.
- Vargo, S./Lusch, R. (2004) Evolving to a New Dominant Logic for Marketing, in: Journal of Marketing 68(1): 1–17.
- Shapiro, C. / Varian, H. (1998), Information Rules - A Strategic Guide to the Network Economy

T 7.58 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-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 7.59 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** **Lecture (V)**
2113077, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
In this course will be discussed the different drive train of mobile machinerys. The fokus of this course is:
- improve knowledge of fundamentals
- mechanical gears
- torque converter
- hydrostatic drives
- continuous variable transmission
- eletrical drives
- hybrid drives
- axles
- terra mechanic

Recommendations:

- general basics of mechanical engineering
- basic knowledge in hydraulics
- interest in mobile machines

- regular attendance: 21 hours
- self-study: 89 hours

Literature
Skriptum zur Vorlesung downloadbar über ILIAS

T 7.60 Course: Economics and Behavior [T-WIWI-102892]

Responsible: Prof. Dr. Nora Szech
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

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

Events					
WS 19/20	2560137	Economics and Behavior	2 SWS	Lecture (V)	Ehrlich, Puppe
WS 19/20	2560138	Übung zu Economics and Behavior	1 SWS	Practice (Ü)	Ehrlich
Exams					
WS 19/20	7900134	Exam Economics and Behavior		Prüfung (PR)	Puppe, Szech
WS 19/20	7900135	Exam Economics and Behavior (2)		Prüfung (PR)	Szech, Puppe

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.
A bonus can be earned through successful participation in the excercise. 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
Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Annotation
The lecture will be held in English.

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

V Economics and Behavior

2560137, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
The course covers topics from behavioral economics with regard to contents and methods. In addition, the students gain insight into the design of economic experiments. Furthermore, the students will become acquainted with reading and critically evaluating current research papers in the field of behavioral economics.

The students

- gain insight into fundamental topics in behavioral economics;
- get to know different research methods in the field of behavioral economics;
- learn to critically evaluate experimental designs;
- get introduced to current research papers in behavioral economics;
- become acquainted with the technical terminology in English.

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.

The grade will be determined in a final written exam. Students can earn a bonus to the final grade by successfully participating in the exercises.

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

The lecture will be held in English.

Recommendations:

Basic knowledge of microeconomics and statistics are recommended. A background in game theory is helpful, but not absolutely necessary.

Literature
Kahnemann, Daniel: Thinking, Fast and Slow. Farrar, Straus and Giroux, 2011.

Ariely, Dan: Predictably Irrational. New York: HarperCollins, 2008.

Ariely, Dan: The Upside of Irrationality. New York: HarperCollins 2011.

T 7.61 Course: Economics I: Microeconomics [T-WIWI-102708]

Responsible: Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101398 - Introduction to Economics

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2610012	Economics I: Microeconomics	3 SWS	Lecture (V)	Puppe
Exams					
WS 19/20	7900276	Economics I: Microeconomics		Prüfung (PR)	Puppe
WS 19/20	7900277	Economics I: Microeconomics		Prüfung (PR)	Puppe

Competence Certificate
The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.

There may be offered a practice exam in the middle of the semester. The results of this exam may be used to improve the grade of the main exam. 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). A detailed descritpion of the examination modalities will be given by the respective lecturer.

The main exam takes place subsequent to the lectur. The re-examination is offered at the same examination period. As a rule, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

Prerequisites
None

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

V Economics I: Microeconomics

2610012, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture (V)

Content
The students learn the basic concepts in Microeconomics and some basics in game theory. The student will understand the working of markets in modern economies and the role of decision making. Furthermore, she should be able to understand simple game theoretic argumentation in different fields of Economics.

In the two main parts of the course problems of microeconomic decision making (household behavior, firm behavior) and problems of commodity allocation on markets (market equilibria and efficiency of markets) as well are discussed. In the final part of the course basics of imperfect competition (oligopolistic markets) and of game theory are presented.

It is the main aim of this course to provide basic knowledge in economic modelling. In particular, the student should be able to analyze market processes and the determinants of market results. Furthermore, she should be able to evaluate the effects of economic policy measures on market behavior and propose alternative, more effective policy measures.

In particular, the student should learn

- to apply simple microeconomic concepts,
- to analyze the structure of real world economic phenomena,
- to judge the possible effects of economic policy measures on the behavior of economic agents (in simple decision problems),
- to suggest alternative policy measures,
- to analyze as a participant of a tutorial simple economic problems by solving written exercises and to present the results of the exercises on the blackboard,
- to become familiar with the basic literature on microeconomics.

The student should gain basic knowledge in order to help in practical problems

- to analyze the structure of microeconomics relationships and to present own problem solutions,
- solve simple economic decision problems.

The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation. The main exam takes place subsequent to the lecture.

The re-examination is offered at the same examination period. Usually, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

The total workload for this course is approximately 150 hours.

Literature

- H. Varian, Grundzüge der Mikroökonomik, 5. Auflage (2001), Oldenburg Verlag
- Pindyck, Robert S./Rubinfeld, Daniel L., Mikroökonomie, 6. Aufl., Pearson. Münschen, 2005
- Frank, Robert H., Microeconomics and Behavior, 5. Aufl., McGraw-Hill, New York, 2005

T 7.62 Course: Economics II: Macroeconomics [T-WIWI-102709]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101398 - Introduction to Economics

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2600014	Economics II: Macroeconomics	4 SWS	Lecture (V)	Scheffel
SS 2020	2660015	Economics II : Macroeconomics, Tutorial	2 SWS	Tutorial (Tu)	Scheffel, Krause
Exams					
WS 19/20	790vwl2	Economics II: Macroeconomics		Prüfung (PR)	Wigger

Competence Certificate
The assessment consists of a written exam (120 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 Economics II: Macroeconomics

2600014, SS 2020, 4 SWS, Language: German, Open in study portal

Lecture (V)

Content
Classical Theory of Macroeconomic Production
Chapter 1: Gross domestic product
Chapter 2: Money and Inflation
Chapter 3: Open Economy I
Chapter 4: Unemployment

Growth: The economy in the long term
Chapter 5: Growth I
Chapter 6: Growth II

Business cycle: The economy in the short term
Chapter 7: Economy and aggregate demand I
Chapter 8: Economy and aggregate demand II
Chapter 9: Open Economy II
Chapter 10: Macroeconomic supply

Advanced topics of macroeconomics
Chapter 11: Dynamic model of the economy as a whole
Chapter 12: Microeconomic foundations
Chapter 13: Macroeconomic economic policy

Learning goals:
The students. . .
- can name the basic indicators, technical terms and concepts of macroeconomics.
- can use models to reduce complex relationships to their basic components.
- can analyse economic policy debates and form their own opinion on them.

Workload:
Total effort for 5 credit points: approx. 150 hours
Presence time: 45 hours
Before and after the LV: 67.5 hours
Exam and exam preparation: 37.5 hours

Literature
Als Grundlage dieser Veranstaltung dient das bekannte Lehrbuch „Makroökonomik“ von Greg Mankiw vom Schäffer Poeschel Verlag in der aktuellen Fassung.

T 7.63 Course: Economics III: Introduction in Econometrics [T-WIWI-102736]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101599 - Statistics and Econometrics

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2520016	Economics III: Introduction to Econometrics	2 SWS	Lecture (V)	Schienle
SS 2020	2520017	Übungen zu VWL III	2 SWS	Practice (Ü)	Schienle, Buse

Competence Certificate
The assessment consists of an 1h written exam according to Section 4(2), 1 of the examination regulation.

Prerequisites
None

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

V Economics III: Introduction to Econometrics

2520016, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Learning objectives:

- Familiarity with the basic concepts and methods of econometrics
- Preparation of simple econometric surveys

Content:

- Simple and multiple linear regression (estimating parameters, confidence interval, testing, prognosis, testing assumptions)
- Model assessment

Requirements:

Knowledge of the lectures Statistics I + II is required.

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 30 hours

Preparation and follow-up: 120 hours

Literature
Von Auer: Ökonometrie ISBN 3-540-00593-5

Goldberger: A course in Econometrics ISBN 0-674-17544-1

Gujarati. Basic Econometrics ISBN 0-07-113964-8

Schneeweiß: Ökonometrie ISBN 3-7908-0008-2

T 7.64 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-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101434 - eBusiness and Service Management
M-WIWI-101465 - Topics in Finance I
M-WIWI-104912 - Information Systems & Digital Business: Platforms

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 7.65 Course: Electric Energy Systems [T-ETIT-101923]

Responsible: Prof. Dr.-Ing. Thomas Leibfried
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-102379 - Power Network

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2307391	Electric Energy Systems	2 SWS	Lecture (V)	Leibfried
SS 2020	2307393	Übungen zu 2307391 Elektroenergiesysteme	1 SWS	Practice (Ü)	Steinle
Exams					
WS 19/20	7307391	Electric Energy Systems		Prüfung (PR)	Leibfried

Prerequisites
none

T 7.66 Course: Electrical Engineering for Business Engineers, Part I [T-ETIT-100533]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101155 - Electrical Engineering

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2304223	Electrical Engineering for Business Engineers, Part I	2 SWS	Lecture (V)	Menesklou
WS 19/20	2304225	Electrical Engineering for Business Engineers, Part I (Tutorial to 2304223)	2 SWS	Practice (Ü)	Menesklou
Exams					
WS 19/20	7304223	Electrical Engineering for Business Engineers, Part I		Prüfung (PR)	Menesklou
SS 2020	7304223	Electrical Engineering for Business Engineers, Part I		Prüfung (PR)	Menesklou

T 7.67 Course: Electrical Engineering for Business Engineers, Part II [T-ETIT-100534]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2304224	Elektrotechnik II für Wirtschaftsingenieure	3 SWS	Lecture (V)	Menesklou
Exams					
WS 19/20	7304224	Electrical Engineering for Business Engineers, Part II		Prüfung (PR)	Menesklou
SS 2020	7304224	Electrical Engineering for Business Engineers, Part II		Prüfung (PR)	Menesklou

T 7.68 Course: Empirical Finance [T-WIWI-110216]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105035 - Empirical Finance

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	2500001	Empirical Finance	4 SWS	Lecture (V)	Ulrich
Exams					
WS 19/20	7900008	Empirical Finance		Prüfung (PR)	Ulrich

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

Prerequisites
None.

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

V Empirical Finance

2500001, WS 19/20, 4 SWS, Language: English, Open in study portal

Lecture (V)

Content
The aim of this course is to introduce the student to empirical data work in financial economics and investments. Students will learn and implement modern portfolio theory and the most important concepts to estimate expected returns and volatility.

The course covers several topics, among them:

Mean-Variance Portfolio Optimization

Modeling Distribution of Asset Returns: Factor Models, ARMA-GARCH

Monte-Carlo Simulation

Parameter Estimation with Maximum Likelihood and Regressions

At the core of this lecture is the work on modern portfolio theory of Markowitz. Students will learn how to allocate investment opportunities to an optimal portfolio under investment constraints. To obtain the necessary inputs to this framework, students will revisit statistical concepts such as linear regression and maximum likelihood estimation to estimate expected returns and volatilities with econometric time series models.

The total workload for this course is approximately 180 hours.

T 7.69 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 7.70 Course: Energy Policy [T-WIWI-102607]

Responsible: Prof. Dr. Martin Wietschel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

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 7.71 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 7.72 Course: Exam on Climatology [T-PHYS-105594]

Responsible: Prof. Dr. Joaquim José Ginete Werner Pinto
Organisation: KIT Department of Physics
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Written examination	1	Each summer term	4

T 7.73 Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-101414 - Methodical Foundations of OR
M-WIWI-101421 - Supply Chain Management

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

Competence Certificate
Due to a research semester of Professor Nickel in WS 19/20, the course "Facility Location and Strategic Supply Chain Management" does NOT take place in WS 19/20. In particular, neither WS 19/20 nor SS 20 will offer an exam for the lecture. The follow-up exam to the lecture in WS 18/19 takes place in SS 19 and is exclusively for students in the second examination.

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.

Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

T 7.74 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-101262 - Emphasis 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 7.75 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-101262 - Emphasis 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
SS 2020	76-T-MACH-102139	Failure of Structural Materials: Fatigue and Creep		Prüfung (PR)	Gruber, 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: 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 7.76 Course: Financial Accounting and Cost Accounting [T-WIWI-102816]

Responsible: Dr. Jan-Oliver Strych
Organisation: KIT Department of Informatics
KIT Department of Economics and Management
Part of: M-WIWI-101578 - Fundamentals of Business Administration 2

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2600002		2 SWS	Lecture (V)	Strych
WS 19/20	2600003	Übung zu Rechnungswesen	2 SWS	Practice (Ü)	Strych
Exams					
WS 19/20	7900304	Financial Accounting and Cost Accounting		Prüfung (PR)	Ruckes

Competence Certificate
The assessment consists of a written exam following §4, Abs. 2, 1 of the examination regulation.
The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.

Prerequisites
None

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

V 2600002, WS 19/20, 2 SWS, Open in study portal **Lecture (V)**

Literature
Coenenberg, Haller und Schultze (2014): Jahresabschluss und Jahresabschlussanalyse, 23. Auflage. Stuttgart: Schäffer-Poeschel.
Hawawini and Viallet (2011): Finance for Executives: Managing for Value Creation. South-Western Cencage Learning.

T 7.77 Course: Financial Accounting for Global Firms [T-WIWI-107505]

Responsible: Dr. Torsten Luedecke
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

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

Events					
WS 19/20	2530242	Financial Accounting for Global Firms	2 SWS	Lecture (V)	Luedecke
WS 19/20	2530243	Übung zu Financial Accounting for Global Firms	SWS	Practice (Ü)	Luedecke
Exams					
WS 19/20	7900142	Financial Accounting for Global Firms		Prüfung (PR)	Luedecke

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
Basic knowledge in corporate finance and accounting.

Annotation
New lecture in the winter term 2017/18.

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

V Financial Accounting for Global Firms

2530242, WS 19/20, 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.

Coenenberg, A.G., Haller, A. und W. Schultze (2016): Jahresabschluss und Jahresabschlussanalyse, 24. Auflage. Schäffer-Poeschel Verlag Stuttgart.

T 7.78 Course: Financial Econometrics [T-WIWI-103064]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics

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 7.79 Course: Financial Intermediation [T-WIWI-102623]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

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 7.80 Course: Financial Management [T-WIWI-102605]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101435 - Essentials of Finance

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

Events					
SS 2020	2530216	Financial Management	2 SWS	Lecture (V)	Ruckes
SS 2020	2530217	Übung zu Financial Management	1 SWS	Practice (Ü)	Ruckes, Schubert
Exams					
WS 19/20	7900060	Financial Management		Prüfung (PR)	Ruckes

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 at every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Knowledge of the content of the course Business Administration: Finance and Accounting [25026/25027] is recommended.

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

V Financial Management

2530216, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur:

- Ross, Westerfield, Jaffe, Jordan (2009): Modern Financial Management, McGraw-Hill International Edition
- Berk, De Marzo (2016): Corporate Finance, 4. Edition, Pearson Addison Wesley

T 7.81 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 7.82 Course: Foundations of Informatics I [T-WIWI-102749]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101417 - Foundations of Informatics

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	2

Events					
SS 2020	2511010	Foundations of Informatics I	2 SWS	Lecture (V)	Sure-Vetter, Färber
SS 2020	2511011	Exercises to Foundations of Informatics I	SWS	Practice (Ü)	Sure-Vetter, Nguyen, Noullet
Exams					
WS 19/20	7900011	Foundations of Informatics I		Prüfung (PR)	Sure-Vetter
SS 2020	7900035	Foundations of Informatics I (Registration until 13 July 2020)		Prüfung (PR)	Sure-Vetter

Competence Certificate
The assessment consists of an 1h written exam according to Section 4 (2), 1 of the examination regulation.

The exam takes place 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 Foundations of Informatics I

2511010, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The lecture provides an introduction to basic concepts of computer science and software engineering. Essential theoretical foundations and problem-solving approaches, which are relevant in all areas of computer science, are presented and explained, as well as shown in practical implementations.

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:

The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Workload:

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

V

Exercises to Foundations of Informatics I

2511011, SS 2020, SWS, Language: German, Open in study portal

Practice (Ü)

Content
The exercises are related to the lecture Foundations of Informatics I.

Multiple exercises are held that capture the topics, held in the lecture Foundations of Informatics I, 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:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

Learning objectives:

The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

Literature

- H. Balzert. Lehrbuch Grundlagen der Informatik. Spektrum Akademischer Verlag 2004.
- U. Schöning. Logik für Informatiker. Spektrum Akademischer Verlag 2000.
- T. H. Cormen, C. E. Leiserson. Introduction to Algorithms, MIT Press 2001.

T 7.83 Course: Foundations of Informatics II [T-WIWI-102707]

Responsible: Dr. rer. nat. Achim Rettinger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101417 - Foundations of Informatics

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2511012	Foundations of Informatics II	3 SWS	Lecture (V)	Landesberger von Antburg
WS 19/20	2511013	Tutorien zu Grundlagen der Informatik II	1 SWS	Tutorial (Tu)	Landesberger von Antburg
Exams					
WS 19/20	7900012	Foundations of Informatics II		Prüfung (PR)	Landesberger von Antburg
SS 2020	7900050	Foundations of Informatics II (Registration until 13 July 2020)		Prüfung (PR)	Sure-Vetter

Competence Certificate
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation. The grade of the exam can be improved by successfully participating in the tutorials. The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
It is recommended to attend the course "Foundations of Informatics I" beforehand.

Active participation in the practical lessons is strongly recommended.

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

V Foundations of Informatics II

2511012, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture (V)

Content
The lecture deals with formal models for automata, languages and algorithms as well as real instances of these models, i.e. computer architecture and organization (hardware development, computer arithmetic, architecture models), programing languages (different language levels, from microprogramming to higher programming languages, as well as compiling and execution), operating systems and modes (architecture and properties of operating systems, operating system tasks, client-server systems), data organization and management (types of data organization, primary and secondary organization).

Learning objectives:

- Students acquire vast knowledge of methods and concepts in theoretical computer science and computer architectures.
- Based on the acquired knowledge and skills, students are capable of choosing and applying the appropriate methods and concepts for well-defined problem instances.
- Active participation in the tutorials enables students to acquire the necessary knowledge for developing appropriate solutions cooperatively.

Recommendations:

It is recommended to attend the course *Foundations of Informatics I* [2511010] beforehand.

Active participation in the practical lessons is strongly recommended.

Workload:

The total workload for this course is approximately 150 hours.

Literature
Weiterführende Literatur:
Literatur wird in der Vorlesung bekannt gegeben.

T 7.84 Course: Foundations of Interactive Systems [T-WIWI-109816]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101434 - eBusiness and Service Management
M-WIWI-102752 - Fundamentals of Digital Service Systems
M-WIWI-104911 - Information Systems & Digital Business: Interaction
M-WIWI-104913 - Information Systems & Digital Business: Servitization

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

Events					
SS 2020	2540560	Foundations of Interactive Systems	3 SWS	Lecture (V)	Mädche, Loewe
Exams					
WS 19/20	7900326	Foundations of Interactive Systems		Prüfung (PR)	Mädche

Competence Certificate
Alternative exam assessment. The assessment is carried out in the form of a one-hour written examination and by carrying out a Capstone project.

Details on the assessment will be announced during the lecture.

Prerequisites
None

Recommendation
None

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

V Foundations of Interactive Systems

2540560, SS 2020, 3 SWS, Language: English, Open in study portal

Lecture (V)

Content
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.

This lecture introduces key concepts and principles of interactive systems from a human and computer perspective. Furthermore, it describes core development processes for interactive systems as well as provides insights on the use & contexts of interactive systems with a specific focus on selected application areas in organizations and society. With this lecture, students acquire foundational knowledge to successfully design of the interaction between human and computers in business and private life.

The course is complemented with a design capstone project, where students in a team apply design methods & techniques in order to create an interactive prototype

Learning Objectives

The students

- have a basic understanding of key conceptual and theoretical foundations of interactive systems from a human and computer perspective
- are aware of important design principles for the design of important classes of interactive systems
- know design processes and techniques for developing interactive systems
- know how to apply the knowledge and skills gathered in the lecture for a real-world problem (as part of design-oriented capstone project)

Prerequisites

No specific prerequisites are required for the lecture

Literature
Alan Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale. 2003. Human-Computer Interaction (3rd Edition). Prentice-Hall, Inc., USA.

Further literature will be made available in the lecture.

T 7.85 Course: Foundations of Mobile Business [T-WIWI-104679]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

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

Exams				
WS 19/20	7900118	Foundations of mobile Business	Prüfung (PR)	Oberweis
SS 2020	7900001	Foundations of mobile Business (Registration until 13 July 2020)	Prüfung (PR)	Oberweis

Competence Certificate
Please note that the lecture will not take place in summer semester 2020 and can only be offered again in summer semester 2021.

The assessment of this course is a written (60 min.) or (if necessary) oral examination according to §4(2) of the examination regulation.

Prerequisites
None

Annotation
Lecture and exercises are integrated.

T 7.86 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 7.87 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
SS 2020	76-T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I		Prüfung (PR)	Bardehle, Unrau

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 7.88 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
SS 2020	76-T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II		Prüfung (PR)	Bardehle, Gauterin

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 7.89 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
SS 2020	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 7.90 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
SS 2020	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 7.91 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 7.92 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 7.93 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 7.94 Course: Fundamentals of Production Management [T-WIWI-102606]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

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

Events					
SS 2020	2581950	Fundamentals of Production Management	2 SWS	Lecture (V)	Schultmann
SS 2020	2581951	Übungen Grundlagen der Produktionswirtschaft	2 SWS	Practice (Ü)	Stallkamp, Steins
Exams					
WS 19/20	7981950	Fundamentals of Production Management		Prüfung (PR)	Schultmann
SS 2020	7981950	Fundamentals of Production 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. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

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

V Fundamentals of Production Management

2581950, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
This lecture focuses on strategic production management with respect to various economic aspects. Interdisciplinary approaches of systems theory will be used to describe the challenges of industrial production. This course will emphasize the importance of R&D as the central step in strategic corporate planning to ensure future long-term success. In the field of site selection and planning for firms and factories, attention will be drawn upon individual aspects of existing and greenfield sites as well as existing distribution and supply centres. Students will obtain knowledge in solving internal and external transport and storage problems.

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.95 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 7.96 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
SS 2020	76-T-MACH-102148	Gear Cutting Technology		Prüfung (PR)	Schulze

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 7.97 Course: Geological Hazards and Risk [T-PHYS-103525]

Responsible: Dr. Ellen Gottschämmer
Organisation: KIT Department of Physics
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Examination of another type	8	Each winter term	2

Events					
WS 19/20	4060121	Geological Hazards and Risk	2 SWS	Lecture (V)	Gottschämmer, Daniell
WS 19/20	4060122	Exercises on Geological Hazards and Risk	2 SWS	Practice (Ü)	Gottschämmer, Daniell
Exams					
WS 19/20	7800114	Geological Hazards and Risk		Prüfung (PR)	Gottschämmer

T 7.98 Course: Global Optimization I [T-WIWI-102726]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-101414 - Methodical Foundations of OR

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 7.99 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-101414 - Methodical Foundations of OR

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 7.100 Course: Global Optimization II [T-WIWI-102727]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR

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 7.101 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
SS 2020	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 7.102 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
SS 2020	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 7.103 Course: High Performance Powder Metallurgy Materials [T-MACH-102157]

Responsible: Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis 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 7.104 Course: Human Resource Management [T-WIWI-102909]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101513 - Human Resources and Organizations

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

Events					
WS 19/20	2573005	Human Resource Management	2 SWS	Lecture (V)	Nieken
WS 19/20	2573006	Übung zu Human Resource Management	1 SWS	Practice (Ü)	Nieken, Mitarbeiter
Exams					
WS 19/20	7900200	Human Resource Management		Prüfung (PR)	Nieken

Competence Certificate
The assessment of this course is a written examination (60 min) according to §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
Completion of module Business Administration is recommended.
Basic knowledge of microeconomics, game theory, and statistics is recommended.

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

V Human Resource Management

2573005, WS 19/20, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Content
The students acquire basic knowledge in the fields of human resource planning, selection and talent management. Differentprocesses and instruments and their link to corporate strategy are evaluated based on microeconomic and behavioral approaches. The results are tested and discussed based on empirical data.

Aim

The student

- understands the processes and instruments of human resource management.
- analyzes different methods of human resource planning and selection and evaluates their usefulness.
- analyzes different processes of talent management and evaluates the strengths and weaknesses.
- understands the challenges of human resource management and its link to corporate strategy.

Workload

The total workload for this course is approximately 135 hours.

Lecture: 32h

Preparation of lecture: 52h

Exam preparation: 51h.

Literature

- Personnel Economics in Practice, Lazear & Gibbs, John Wiley & Sons, 2014
- Strategic Human Resources. Frameworks for General Managers, Baron & Kreps, John Wiley & Sons, 1999

T 7.105 Course: Hydraulic Engineering and Water Management [T-BGU-101667]

Responsible: Prof. Dr. Franz Nestmann
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	6200511	Wasserbau und Wasserwirtschaft	2 SWS	Lecture (V)	Nestmann
WS 19/20	6200512	Übungen zu Wasserbau und Wasserwirtschaft	1 SWS	Practice (Ü)	Seidel
Exams					
WS 19/20	8230101667	Hydraulic Engineering and Water Management		Prüfung (PR)	Nestmann

Competence Certificate
written exam with 60 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.106 Course: Hydrology [T-BGU-101693]

Responsible: Prof. Dr.-Ing. Erwin Zehe
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	6200513	Hydrologie	2 SWS	Lecture (V)	Zehe, Wienhöfer
WS 19/20	6200514	Übungen zu Hydrologie	1 SWS	Practice (Ü)	Zehe, Wienhöfer
Exams					
WS 19/20	8230101693	Hydrology		Prüfung (PR)	Wienhöfer, Zehe

Prerequisites
None

Recommendation
None

Annotation
None

T 7.107 Course: I4.0 Systems Platform [T-MACH-106457]

Responsible: Dipl.-Ing. Thomas Maier
Prof. Dr.-Ing. Jivka Ovtcharova

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

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

Events					
WS 19/20	2123900	I4.0 Systems platform	4 SWS	Prüfung (PR)	Ovtcharova, Maier
SS 2020	2123900	I4.0 Systems platform	4 SWS	Project (PRO)	Ovtcharova, Maier
Exams					
WS 19/20	76-T-MACH-106457	I4.0 Systems platform		Prüfung (PR)	Ovtcharova

Competence Certificate
Alternative exam assessment (project work)

Prerequisites
None

Annotation
Limited number of participants.

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

V I4.0 Systems platform

2123900, WS 19/20, 4 SWS, Language: German, Open in study portal

Prüfung (PR)

Content
Industry 4.0, IT systems for fabrication (e.g.: CAx, PDM, CAM, ERP, MES), process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- describe the fundamental concepts, challenges, and objectives of Industrie 4.0 and name the essential terms in context of information management
- explain the necessary information flow between the different IT systems. They get practically knowledge about using current IT systems in context of I4.0, from order to production.
- 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 I4.0 Systems platform

2123900, SS 2020, 4 SWS, Language: German, Open in study portal

Project (PRO)

Content
Industry 4.0, IT systems for fabrication (e.g.: CAx, PDM, CAM, ERP, MES), process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- describe the fundamental concepts, challenges, and objectives of Industrie 4.0 and name the essential terms in context of information management
- explain the necessary information flow between the different IT systems. They get practically knowledge about using current IT systems in context of I4.0, from order to production.
- 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 7.108 Course: Industrial Organization [T-WIWI-102844]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

Type	Credits	Recurrence	Version
Written examination	4,5	Irregular	1

Events					
SS 2020	2560238	Industrial Organization	2 SWS	Lecture (V)	Reiß, Peters
SS 2020	2560239	Übung zu Industrieökonomie	2 SWS	Practice (Ü)	Peters, Reiß
Exams					
WS 19/20	7900310	Industrial Organization		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
Completion of the module Economics [WW1VWL] is assumed.

Annotation
This course is not given in summer 2017.

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

V Industrial Organization
2560238, SS 2020, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Literature
Verpflichtende Literatur:
H. Bester (2012): Theorie der Industrieökonomik, Springer-Verlag.
Ergänzende Literatur:
J. Tirole (1988): Theory of Industrial Organization, MIT Press.
D. Carlton / J. Perloff (2005): Modern Industrial Organization, Pearson.
P. Belleflamme / M. Peitz (2010): Industrial Organization

T 7.109 Course: Information Engineering [T-MACH-102209]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

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 7.110 Course: Integrated Information Systems for Engineers [T-MACH-102083]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2020	2121001	Integrated Information Systems for engineers	3 SWS	Lecture / Practice (VÜ)	Ovtcharova, Elstermann
Exams					
WS 19/20	76-T-MACH-102083	Integrated Information Systems for Engineers		Prüfung (PR)	Ovtcharova

Competence Certificate
Oral examination 20 min.

Prerequisites
None

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

V Integrated Information Systems for engineers

2121001, SS 2020, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content

- Information systems, information management
- CAD, CAP and CAM systems
- PPS, ERP and PDM systems
- Knowledge management and ontology
- Process modeling

Students can:

- illustrate the structure and operating mode of information systems
- describe the structure of relational databases
- describe the fundamentals of knowledge management and its application in engineering and deploy ontology as knowledge representation
- describe different types of process modelling and their application and illustrate and execute simple work flows and processes with selected tools
- explain different goals of specific IT systems in product development (CAD, CAP, CAM, PPS, ERP, PDM) and assign product development processes

Literature
Vorlesungsfolien / lecture slides

T 7.111 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 7.112 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-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
SS 2020	76-T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars		Prüfung (PR)	Lanza

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 7.113 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101402 - eFinance
M-WIWI-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

Type	Credits	Recurrence	Version
Written examination	3	see Annotations	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
The course will not be offered in the summer semester 2020 as originally planned, but only in the winter semester 2020/2021.

The course is offered as a 14-day or block course.

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

V International Finance

2530570, SS 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 7.114 Course: International Marketing [T-WIWI-102807]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

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

Events					
WS 19/20	2572155	International Marketing	1 SWS	Lecture (V)	Feurer
Exams					
WS 19/20	7900123	International Marketing		Prüfung (PR)	Klarmann
WS 19/20	7900128	International Marketing		Prüfung (PR)	Klarmann

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 International Marketing

2572155, WS 19/20, 1 SWS, Language: English, Open in study portal

Lecture (V)

Content
Doing marketing abroad creates a number of significant new challenges for firms. This class is intended to prepare you for meeting these challenges. In the first session, we will discuss the peculiarities of international marketing. The next five sessions will then be dedicated to methods that can be used to address them. For instance, we will look at the following issues:

- Internationalization strategies
- Market entry strategies
- Standardization vs. individualization (e.g. regarding products, prices, and communication)
- Measurement equivalence in international market research

In the final session, we will apply this knowledge to the case of Wal Mart. In particular, Wal Mart, despite being the largest retailing company worldwide, failed to successfully enter the German Market. We will discuss Wal Mart's failure using the methods taught in the weeks before.

Students

- know the characteristics of international marketing
- are familiar with the Hofstede's cultural dimensions theory
- understand basic concepts of cultural learning (the concept of acculturation, the psychic distance paradox)
- know different concepts that explain international buying behavior (e.g. country-of-origin effects)
- comprehend different concepts for market entries in an international context ("waterfall"-strategy, "sprinkler"-strategy, method of analogy, chain ratio method)
- understand what needs to be considered regarding international market research (dealing with ethical dilemmas, challenges regarding primary and secondary data sources, testing measurement equivalence, linguistic equivalence, differences in the response styles of questionnaires)
- know the particularities of international product policy (standardization vs. differentiation, challenge of branding, fight against product plagiarism, brand counterfeiting and product piracy, protection of intellectual property)
- are familiar with the particularities in the international price policy (BigMac Index, how to deal with price demand functions to achieve profit maximization, arbitrage, price corridor, standardization vs. differentiation of prices, how to deal with currency risks, inflation, exchange rates and different willingness to pay)
- know the characteristics of the international communication policy (different laws, problems regarding international standardized campaigns)
- know particularities of the international sales policy (international channels, differences of contract negotiations)
- are able to organize international marketing departments and subsidiaries
- know the problems of marketing in emerging markets

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 45.0 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.

T 7.115 Course: Internship [T-WIWI-102611]

Responsible: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101419 - Internship

Type	Credits	Version
Completed coursework	10	2

Competence Certificate
see module description

Prerequisites
Kein

T 7.116 Course: Introduction to Ceramics [T-MACH-100287]

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

Part of: M-MACH-101262 - Emphasis 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 7.117 Course: Introduction to Energy Economics [T-WIWI-102746]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

Type	Credits	Recurrence	Version
Written examination	5,5	Each summer term	3

Events					
SS 2020	2581010	Introduction to Energy Economics	2 SWS	Lecture (V)	Fichtner
SS 2020	2581011	Übungen zu Einführung in die Energiewirtschaft	2 SWS	Practice (Ü)	Lehmann, Sandmeier, Ardone
Exams					
WS 19/20	7981010	Introduction to Energy Economics		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (90 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 Introduction to Energy Economics

2581010, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content

1. Introduction: terms, units, conversions
2. The energy carrier gas (reserves, resources, technologies)
3. The energy carrier oil (reserves, resources, technologies)
4. The energy carrier hard coal (reserves, resources, technologies)
5. The energy carrier lignite (reserves, resources, technologies)
6. The energy carrier uranium (reserves, resources, technologies)
7. The final carrier source electricity
8. The final carrier source heat
9. Other final energy carriers (cooling energy, hydrogen, compressed air)

The student is able to

- characterize and judge the different energy carriers and their peculiarities,
- understand contexts related to energy economics.

Literature
Weiterführende Literatur:

Pfaffenberger, Wolfgang. Energiewirtschaft. ISBN 3-486-24315-2

Feess, Eberhard. Umweltökonomie und Umweltpolitik. ISBN 3-8006-2187-8

Müller, Leonhard. Handbuch der Elektrizitätswirtschaft. ISBN 3-540-67637-6

Stoft, Steven. Power System Economics. ISBN 0-471-15040-1

Erdmann, Georg. Energieökonomik. ISBN 3-7281-2135-5

T 7.118 Course: Introduction to Engineering Geology [T-BGU-101500]

Responsible: Prof. Dr. Philipp Blum
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	6339057	Einführung in die Ingenieurgeologie	4 SWS	Lecture / Practice (VÜ)	Blum
Exams					
WS 19/20	8210_101500	Introduction to Engineering Geology		Prüfung (PR)	Blum

Prerequisites
none

T 7.119 Course: Introduction to Engineering Mechanics I: Statics and Strength of Materials [T-MACH-102208]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101259 - Engineering Mechanics

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2020	2162238	Introduction to Engineering Mechanics I: Statics and Strength of Materials	2 SWS	Lecture (V)	Fidlin
SS 2020	2162239	Introduction to Engineering Mechanics I: Statics and Strength of Materials (Tutorial)	1 SWS	Practice (Ü)	Fidlin, Altoé
Exams					
WS 19/20	76-T-MACH-102208-1	Introduction to Engineering Mechanics I: Statics (75min)		Prüfung (PR)	Fidlin
WS 19/20	76-T-MACH-102208-2	Introduction to Engineering Mechanics I: Statics and Strength of Materials (120min)		Prüfung (PR)	Fidlin
SS 2020	76-T-MACH-102208-1	Introduction to Engineering Mechanics I: Statics(75 Min)		Prüfung (PR)	Fidlin
SS 2020	76-T-MACH-102208-2	Introduction to Engineering Mechanics I: Statics and Strength of Materials (120 Min)		Prüfung (PR)	Fidlin

Competence Certificate
The assessment consists of a written examination (120 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place in every semester. Re-examinations are offered at eyery ordinary examination date.

For students of economics the assessement consists of a written examination (Statics - 75 min.)

Permitted utilities: non-programmable calculator

Prerequisites
None

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

V Introduction to Engineering Mechanics I: Statics and Strength of Materials — Lecture (V)

2162238, SS 2020, 2 SWS, Language: German, Open in study portal

Content
Statics: force · moment · general equilibrium condistions · center of mass · inner force in structure · plane frameworks · theory of adhesion

T 7.120 Course: Introduction to Engineering Mechanics II : Dynamics [T-MACH-102210]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2161276	Introduction to Engineering Mechanics II : Dynamics	2 SWS	Lecture (V)	Fidlin
Exams					
WS 19/20	76-T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics		Prüfung (PR)	Fidlin
SS 2020	76-T-MACH-102210	Introduction to Engineering Mechanics II : Dynamics		Prüfung (PR)	Fidlin

Competence Certificate
The assessment consists of a written examination (75 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination is offered every semester. Re-examinations are offered at every ordinary examination date.
Permitted utilities: non-programmable calculator, literature.

Prerequisites
None

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

V Introduction to Engineering Mechanics II : Dynamics

2161276, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

T 7.121 Course: Introduction to Game Theory [T-WIWI-102850]

Responsible: Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101499 - Applied Microeconomics
M-WIWI-101501 - Economic Theory

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

Events					
SS 2020	2520525	Introduction to Game Theory	2 SWS	Lecture (V)	Puppe
SS 2020	2520526	Übungen zu Einführung in die Spieltheorie	1 SWS	Practice (Ü)	Puppe
Exams					
WS 19/20	7900311	Introduction to Game Theory		Prüfung (PR)	Reiß

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 the recess period and can be resited 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 Introduction to Game Theory

2520525, SS 2020, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Content
The course focusses on non-cooperative game theory. It discusses models, solution concepts, and applications for simultaneous games as well as sequential games. Various solution concepts, e.g., Nash equilibrium and subgame-perfect equilibrium, are introduced along with more advanced concepts. A short introduction to cooperative game theory is given if there is sufficient time.

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

The exam takes place in the recess period and can be resited at every ordinary examination date.

The module [M-WIWI-101398] *Introduction to Economics* must have been passed.

Recommendations:

Basic knowledge of mathematics and statistics is assumed.

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

This course offers an introduction to the theoretical analysis of strategic interaction situations. At the end of the course, students shall be able to analyze situations of strategic interaction systematically and to use game theory to predict outcomes and give advice in applied economics settings.

Compulsory textbook:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Additional Literature:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

Literature
Verpflichtende Literatur:

Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf.

Ergänzende Literatur:

Berninghaus/Ehrhart/Güth (2010): Strategische Spiele, Springer Verlag.

Binmore (1991): Fun and Games, DC Heath.

Fudenberg/Tirole (1991): Game Theory, MIT Press.

Heifetz (2012): Game Theory, Cambridge Univ. Press.

T 7.122 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-101681]

Responsible: Dr.-Ing. Norbert Rösch
Dr.-Ing. Sven Wursthorn
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	6071101	Einführung in GIS für Studierende natur-, ingenieur- und geowissenschaftlicher Fachrichtungen, V/Ü	4 SWS	Lecture / Practice (VÜ)	Rösch, Wursthorn
Exams					
WS 19/20	8280101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences		Prüfung (PR)	Rösch, Wursthorn

T 7.123 Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences, Prerequisite [T-BGU-103541]

Responsible: Dr.-Ing. Norbert Rösch
Dr.-Ing. Sven Wursthorn

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Completed coursework	3	Each winter term	1

Events					
WS 19/20	6071101	Einführung in GIS für Studierende natur-, ingenieur- und geowissenschaftlicher Fachrichtungen, V/Ü	4 SWS	Lecture / Practice (VÜ)	Rösch, Wursthorn
Exams					
WS 19/20	8280101681	Introduction to GIS for Students of Natural, Engineering and Geo Sciences		Prüfung (PR)	Rösch, Wursthorn
WS 19/20	8280103541	Introduction to GIS for Students of Natural, Engineering and Geo Sciences		Prüfung (PR)	Rösch, Wursthorn

T 7.124 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-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 7.125 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-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 7.126 Course: Introduction to Operations Research I and II [T-WIWI-102758]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101418 - Introduction to Operations Research

Type	Credits	Recurrence	Version
Written examination	9	see Annotations	1

Events					
WS 19/20	2530043	Introduction to Operations Research II	2 SWS	Lecture (V)	Stein
WS 19/20	2530044		SWS	Tutorial (Tu)	Assistenten, Stein
SS 2020	2550040	Introduction to Operations Research I	2 SWS	Lecture (V)	Rebennack
Exams					
WS 19/20	7900001_WS1920_HK	Introduction to Operations Research I and II		Prüfung (PR)	Stein

Competence Certificate
The assessment of the module is carried out by a written examination (120 minutes) according to Section 4(2), 1 of the examination regulation.

In each term (usually in March and July), one examination is held for both courses.

The overall grade of the module is the grade of the written examination.

Prerequisites
None

Recommendation
Mathematics I und II. Programming knowledge for computing exercises.

It is strongly recommended to attend the course *Introduction to Operations Research I* [2550040] before attending the course *Introduction to Operations Research II* [2530043].

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

V Introduction to Operations Research II

2530043, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Integer and Combinatorial Programming: Basic notions, cutting plane metehods, branch and bound methods, branch and cut methods, heuristics.

Nonlinear Programming: Basic notions, optimality conditions, solution methods for convex and nonconvex optimization problems.

Dynamic and stochastic models and methods: dynamical programming, Bellman method, lot sizing models, dyanical and stochastic inventory models, queuing theory.

Learning objectives:

The student

- names and describes basic notions of integer and combinatorial optimization, nonlinear programming, and dynamic programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Literature

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

V

Introduction to Operations Research I

2550040, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
Examples for typical OR problems.

Linear Programming: Basic notions, simplex method, duality, special versions of the simplex method (dual simplex method, three phase method), sensitivity analysis, parametric optimization, game theory.

Graphs and Networks: Basic notions of graph theory, shortest paths in networks, project scheduling, maximal and minimal cost flows in networks.

Learning objectives:

The student

- names and describes basic notions of linear programming as well as graphs and networks,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve optimization problems independently,
- validates, illustrates and interprets the obtained solutions.

Literature

- Nickel, Stein, Waldmann: Operations Research, 2. Auflage, Springer, 2014
- Hillier, Lieberman: Introduction to Operations Research, 8th edition. McGraw-Hill, 2005
- Murty: Operations Research. Prentice-Hall, 1995
- Neumann, Morlock: Operations Research, 2. Auflage. Hanser, 2006
- Winston: Operations Research - Applications and Algorithms, 4th edition. PWS-Kent, 2004

T 7.127 Course: Introduction to Programming with Java [T-WIWI-102735]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101581 - Introduction to Programming

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	2

Events					
WS 19/20	2511000	Introduction to Programming with Java	3 SWS	Lecture (V)	Zöllner
WS 19/20	2511002	Tutorien zu Programmieren I: Java	1 SWS	Tutorial (Tu)	Zöllner, Struppek, Ulrich
WS 19/20	2511003	Computer lab Introduction to Programming with Java	2 SWS		Zöllner, Struppek, Ulrich
Exams					
WS 19/20	7900018	Introduction to Programming with Java		Prüfung (PR)	Zöllner
SS 2020	7900042	Introduction to Programming with Java (Registration until 15 June 2020)		Prüfung (PR)	Zöllner

Competence Certificate
The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation.
The successful completion of the compulsory tests in the computer lab is prerequisited for admission to the written resp. computer-based exam.

The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Annotation
see german version

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

V Introduction to Programming with Java

2511000, WS 19/20, 3 SWS, Language: German, Open in study portal — **Lecture (V)**

Content
The lecture "Introduction to Programming with Java " introduces systematic programming and provides essential practical basics for all advanced computer science lectures.

Based on considerations of the structured and systematic design of algorithms, the most important constructs of modern higher programming languages as well as programming methods are explained and illustrated with examples. One focus of the lecture is on teaching the concepts of object-oriented Programming. Java is used as the programming language. Knowledge of this language is required in advanced computer science lectures.

At the end of the lecture period, a written examination will be held for which admission must be granted during the semester after successful participation in the practices. The exact details will be announced in the lecture.

Learning objectives:

- Knowledge of the fundamentals, methods and systems of computer science.
- The students acquire the ability to independently solve algorithmic problems in the programming language Java, which dominates in business applications.
- In doing so, they will be able to find strategic and creative answers in finding solutions to well-defined, concrete and abstract problems.

Workload:

The total workload for this course is approximately 150 hours. For further information see German version.

Literature
Ratz, D. Schulmeister-Zimolong, D. Seese, J. Wiesenberger. Grundkurs Programmieren in Java. 8. Aktualisierte und erweiterte Auflage, Hanser 2018

T 7.128 Course: Introduction to Public Finance [T-WIWI-102877]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101403 - Public Finance

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

Events					
WS 19/20	2560131	Introduction to Public Finance	3 SWS	Lecture (V)	Wigger

Competence Certificate
The assessment consists of a written exam (60 min.).

Prerequisites
None

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

V Introduction to Public Finance

2560131, WS 19/20, 3 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course *Introduction to Public Finance* provides an overview of the fundamental issues in public economics. The first part of the course deals with normative theories about the economic role of the state in a market economy. Welfare economics theory is offered as a base model, with which alternative normative theories are compared and contrasted. Within this theoretical framework, arguments concerning efficiency and equity are developed as justification for varying degrees of economic intervention by the state. The second part of the course deals with the positivist theory of public economics. Processes of public decision making are examined and the conditions that lead to market failures resulting from collective action problems are discussed. The third part of the course examines a variety of public spending programs, including social security systems, the public education system, and programs aimed at reducing poverty. The fifth part of the course addresses the key theoretical and political issues associated with fiscal federalism.

Learning goals:

Students are able to:

- critically assess the economic role of the state in a market economy
- explain and discuss key concepts in public finance, including: public goods; economic externalities; and market failure
- explain and critically discuss competing theoretical approaches to public finance, including welfare economics and public choice theory
- explain the theory of bureaucracy according to Weber and critically assess its strengths and weaknesses
- evaluate the incentives inherent in the bureaucratic model, as well as the more recent introduction of market-oriented incentives associated with public-sector reform

Workload:

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

Literature
Literatur:

Wigger, B. U. 2006. *Grundzüge der Finanzwissenschaft*. Springer: Berlin.

T 7.129 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR
M-WIWI-103278 - Optimization under Uncertainty

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 7.130 Course: Investments [T-WIWI-102604]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101435 - Essentials of Finance

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

Events					
SS 2020	2530575	Investments	2 SWS	Lecture (V)	Uhrig-Homburg, Thimme
SS 2020	2530576	Übung zu Investments	1 SWS	Practice (Ü)	Uhrig-Homburg, Eberbach
Exams					
WS 19/20	7900054	Investments		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment consits of a written exam (75 min) according to Section 4(2), 1 of the examination regulation.
The examination takes place in every semester. Re-examinations are offered at eyery ordinary 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 of Business Administration: Finance and Accounting [2610026] is recommended.

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

V Investments

2530575, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur:

Bodie/Kane/Marcus (2010): Essentials of Investments, 8. Aufl., McGraw-Hill Irwin, Boston

T 7.131 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 7.132 Course: Learning Factory “Global Production“ [T-MACH-105783]

Responsible: Prof. Dr.-Ing. Gisela Lanza
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 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 7.133 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 7.134 Course: Logistics and Supply Chain Management [T-WIWI-102870]

Responsible: Prof. Dr. Frank Schultmann
Dr. Marcus Wiens
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Recurrence	Version
Written examination	3,5	Each summer term	1

Events					
SS 2020	2581996	Logistics and Supply Chain Management	2 SWS	Lecture (V)	Wiens, Schultmann
SS 2020	2581997	Übung zu Logistics and Supply Chain Management	1 SWS	Practice (Ü)	Diehlmann, Lüttenberg
Exams					
WS 19/20	7981996	Logistics and Supply Chain Management		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

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

V Logistics and Supply Chain Management

2581996, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
Students are introduced to the methods and tools of logistics and supply chain management. They students learn the key terms and components of supply chains together with key economic trade-offs. In detail, students gain knowledge of decisions in supply chain management, such as facility location, supply chain planning, inventory management, pricing and supply chain cooperation. In this manner, students will gain knowledge in analyzing, designing and steering of decisions in the domain of logistics and supply chain management.

- Introduction: Basic terms and concepts
- Facility location and network optimization
- Supply chain planning I: flexibility
- Supply chain planning II: forecasting
- Inventory management & pricing
- Supply chain coordination I: the Bullwhip-effect
- Supply chain coordination II: double marginalization
- Supply chain risk management

Literature
Wird in der Veranstaltung bekannt gegeben.

T 7.135 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
SS 2020	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 7.136 Course: Macroeconomic Theory [T-WIWI-109121]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101501 - Economic Theory
M-WIWI-101668 - Economic Policy I

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2560404	Macroeconomic Theory	2 SWS	Lecture (V)	Scheffel
WS 19/20	2560405	Übung zu Macroeconomic Theory	1 SWS	Practice (Ü)	Pegorari
Exams					
WS 19/20	7900264	Macroeconomic Theory		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 Macroeconomic Theory

2560404, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)

Literature
Literatur und Skripte werden in der Veranstaltung angegeben.

T 7.137 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 7.138 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 7.139 Course: Management and Strategy [T-WIWI-102629]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101425 - Strategy and Organization

Type	Credits	Recurrence	Version
Written examination	3,5	Each summer term	1

Events					
SS 2020	2577900	Management and Strategy	2 SWS	Lecture (V)	Lindstädt
Exams					
WS 19/20	7900199	Management and Strategy		Prüfung (PR)	Lindstädt

Competence Certificate
The assessment consists of a written exam (60 min) taking place at the beginn of the recess period (according to §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 Management and Strategy

2577900, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration. Thereby a focus is on imparting knowledge about how price developments in oligopolistic markets can be understood, modeled and forecasted based on game theory.

Content in brief:

- Corporate management principles
- Strategic management principles
- Strategic analysis
- Competitive strategy: modelling and selection on a divisional level
- Strategies for oligopolies and networks: anticipation of dependencies
- Corporate strategy: modelling and evaluation on a corporate level
- Strategy implementation

Learning Objectives:

After passing this course students are able to

- prepare strategic decisions along the ideal-typical strategy process in practice ("strategic analysis").
- assess strategic options.
- explain the portfolio management (Parental advantage and best owner of business entities).
- discuss price and capacity decisions in oligopolies and explain them in examples.

Recommendations:

None.

Workload:

The total workload for this course is approximately 105.0 hours. For further information see German version.

Assessment:

The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Literature

- Pidun, U.: *Corporate Strategy: Theory and Practice*. Springer-Gabler, Wiesbaden 2019.
- Lindstädt, H.; Hauser, R.: *Strategische Wirkungsbereiche des Unternehmens*. Gabler, Wiesbaden 2004.
- Grant, R.M.: *Strategisches Management*. Pearson Studium, 5., aktualisierte Aufl., München 2006.

Die relevanten Auszüge und zusätzliche Quellen werden in der Veranstaltung bekannt gegeben.

T 7.140 Course: Managing Organizations [T-WIWI-102630]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101425 - Strategy and Organization
M-WIWI-101513 - Human Resources and Organizations

Type	Credits	Recurrence	Version
Written examination	3,5	Each winter term	3

Events					
WS 19/20	2577902	Managing Organizations	2 SWS	Lecture (V)	Lindstädt
Exams					
WS 19/20	7900049	Managing Organizations		Prüfung (PR)	Lindstädt

Competence Certificate
The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 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

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

V Managing Organizations

2577902, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course should enable the participants to assess the strengths and weaknesses of existing organisational structures and rules using systematic criteria. Here concepts and models for designing organisation structures, regulating organizational processes and managing organisational changes are presented and discussed using case studies. The course is structured to relate to actions and aims to give students a realistic view of the opportunities and limits of rational design approaches.

Content in brief:

- Principles of organisational management
- Managing organisational structures and processes: the selection of design parameters
- Ideal-typical organisational structures: choice and effect of parameter combinations
- Managing organisational changes

Learning Objectives:

After passing this course students are able to

- evaluate strengths and weaknesses of existing organisational structures and rules.
- compare alternatives of organisational structure in practice and assess and interpret them regarding their effectiveness and efficiency.
- assess the management of organisational changes.

Recommendations:

None.

Workload:

The total workload for this course is approximately 105.0 hours. For further information see German version.

Assessment:

The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A bonus can be acquired through successful participation in the exercises. 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 the award of a bonus will be announced at the beginning of the lecture.

Literature

- Laux, H.; Liermann, F.: *Grundlagen der Organisation*, Springer. 6. Aufl. Berlin 2005.
- Lindstädt, H.: *Organisation*, in Scholz, C. (Hrsg.): Vahlens Großes Personallexikon, Verlag Franz Vahlen. 1. Aufl. München, 2009.
- Schreyögg, G.: *Organisation. Grundlagen moderner Organisationsgestaltung*, Gabler. 4. Aufl. Wiesbaden 2003.

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.

T 7.141 Course: Managing the Marketing Mix [T-WIWI-102805]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

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

Events					
SS 2020	2571152	Managing the Marketing Mix	2 SWS	Lecture (V)	Klarmann
SS 2020	2571153	Übung zu Marketing Mix (Bachelor)	1 SWS	Practice (Ü)	Moosbrugger, Halbauer
Exams					
WS 19/20	7900185	Managing the Marketing Mix		Prüfung (PR)	Klarmann

Competence Certificate
The assessment is carried out by the preparation and presentation of a case study (max 30 points) as well as a written exam (max 60 points). In total, a maximum of 90 points can be achieved in the event.

Prerequisites
None

Annotation
The course is compulsory in the module "Foundations of Marketing".
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 Managing the Marketing Mix

2571152, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The content of this course concentrates on the elements of the marketing mix. Therefore the main chapters are:

- Brand management
- Pricing
- Promotion

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

This course is compulsory within or the module "Foundations of Marketing" and must be examined.

Learning objectives:

student

- know the meaning of the branding, the brand positioning and the possibilities of the brand value calculation
- understand the price behavior of customers and can apply this knowledge to the practice
  know different methods for price determination (conjoint analysis, cost-plus determination, target costing, customer surveys, value-in-use) and price differentiation
- are able to name and explain the relevant communication theories
- can name and judge different possibilities of the Intermediaplanung
- know various design elements of advertising communication
- understand the measurement of advertising impact and can apply it

Workload:

The total workload for this course is approximately 135.0 hours.

Literature

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

T 7.142 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
SS 2020	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 7.143 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 7.144 Course: Material Science II for Business Engineers [T-MACH-102079]

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

Part of: M-MACH-101261 - Emphasis in Fundamentals of Engineering
M-MACH-101262 - Emphasis Materials Science
M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2126782	Materials Science II for Business Engineers	2 SWS	Lecture (V)	Hoffmann
Exams					
WS 19/20	76-T-MACH-102079	Material Science II		Prüfung (PR)	Hoffmann, Wagner, Schell, Bucharsky, Hinterstein

Competence Certificate
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the winter term is carried out by a written or oral exam.

Prerequisites
The module *Material Science* has to be completed beforehand.

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

V Materials Science II for Business Engineers

2126782, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur:

- Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
- Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
- Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
- Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7

T 7.145 Course: Materials Science I [T-MACH-102078]

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

Part of: M-MACH-101260 - Materials Science

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2125760	Materials Science I	2 SWS	Lecture (V)	Hoffmann
Exams					
WS 19/20	76-T-MACH-102078	Materials Science I		Prüfung (PR)	Hoffmann, Wagner, Schell, Hinterstein, Bucharsky

Competence Certificate
The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.

Prerequisites
None

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

V Materials Science I

2125760, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Weiterführende Literatur:

Werkstoffwissenschaften - Eigenschaften, Vorgänge, Technologien, B. Ilscher, Springer – Verlag, Berlin Heidelberg New York, ISBN 3-540-10725-5
Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
Metallkunde für das Maschinenwesen I/II, K.G. Schmitt-Thomas, Springer-Verlag, ISBN 3-540-51913-0
Materials Science and Engineering – An Introduction, William D. Callister (Jr.), John Wiley & Son, ISBN-10: 978-0-471-73696-7.

T 7.146 Course: Mathematics I - Final Exam [T-MATH-102261]

Responsible: Dr. Martin Folkers
Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-101676 - Mathematics 1

Type	Credits	Version
Written examination	3,5	1

Exams				
WS 19/20	6700013	Mathematics I - Final Exam	Prüfung (PR)	Folkers, Last, Winter

T 7.147 Course: Mathematics I - Midterm Exam [T-MATH-102260]

Responsible: Dr. Martin Folkers
Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-101676 - Mathematics 1

Type	Credits	Version
Written examination	3,5	1

Events					
WS 19/20	0135000	Mathematik 1 für die Fachrichtung Wirtschaftswissenschaften	4 SWS	Lecture (V)	Folkers
WS 19/20	0135100	Übungen zu 0135000	2 SWS	Practice (Ü)	Folkers
Exams					
WS 19/20	6700040	Mathematics I - Midterm Exam		Prüfung (PR)	Winter, Last, Folkers

T 7.148 Course: Mathematics II - Final Exam [T-MATH-102263]

Responsible: Dr. Martin Folkers
Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-101677 - Mathematics 2

Type	Credits	Version
Written examination	3,5	1

T 7.149 Course: Mathematics II - Midterm Exam [T-MATH-102262]

Responsible: Dr. Martin Folkers
Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-101677 - Mathematics 2

Type	Credits	Version
Written examination	3,5	1

Events					
SS 2020	0183000	Mathematik 2 für die Fachrichtung Wirtschaftswissenschaft	4 SWS	Lecture (V)	Folkers
SS 2020	0183100	Übungen zu 0183000	2 SWS	Practice (Ü)	Folkers

T 7.150 Course: Mathematics III - Final Exam [T-MATH-102264]

Responsible: Dr. Martin Folkers
Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
PD Dr. Steffen Winter

Organisation: KIT Department of Mathematics

Part of: M-MATH-101679 - Mathematics 3

Type	Credits	Version
Written examination	7	1

Events					
WS 19/20	0135200	Mathematik 3 für die Fachrichtung Wirtschaftswissenschaften	4 SWS	Lecture (V)	Winter
WS 19/20	0135300	Übungen zu 0135200	2 SWS	Practice (Ü)	Winter
Exams					
WS 19/20	6700031	Mathematics III - Final Exam		Prüfung (PR)	Winter, Last
WS 19/20	6700051	Mathematics III - Final Exam		Prüfung (PR)	Winter

T 7.151 Course: Mechanical Design Basics I and II [T-MACH-110363]

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

Part of: M-MACH-101299 - Mechanical Design

Type	Credits	Recurrence	Version
Written examination	7	Each winter term	1

Events					
WS 19/20	2145131	Mechanical Design Basics I	2 SWS	Lecture (V)	Albers, Matthiesen, Behrendt
SS 2020	2146131	Mechanical Design Basics II	2 SWS	Lecture (V)	Albers, Matthiesen
Exams					
WS 19/20	76-T-MACH-104739	Mechanical Design I and II		Prüfung (PR)	Albers, Matthiesen

Competence Certificate
Written Exam (90min) on the topics of MKLGI and MKLGII.

Prerequisites
The bricks "T-MACH-110364 - Mechanical Design Basics I, Tutorial" and "T-MACH-110365 - Mechanical Design Basics II, Tutorial" must be passed successfully.

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

V Mechanical Design Basics I

2145131, WS 19/20, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Literature
Vorlesungsumdruck:

Der Umdruck zur Vorlesung kann über die eLearning-Plattform Ilias bezogen werden.

Literatur:

Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

Grundlagen von Maschinenelementen für Antriebsaufgaben;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

V Mechanical Design Basics II

2146131, SS 2020, 2 SWS, Language: German, Open in study portal — **Lecture (V)**

Content
Design

Dimensioning

Component connections

Bolted connection

Prerequisites:

MIT:

In a workshop with 3 project sessions the students will be divided into groups and their knowledge will be tested. Attendance in all 3 project sessions is compulsory and is checked. In colloquia the knowledge from the lecture will be tested at the beginning of the project sessions. The successful completion of the colloquia as well as the completion of the workshop task is a prerequisite for successful participation.

CIW/ VT/ IP-M/ WiING / NWT/ MATH/ MWT:

During the lecture, students must apply the knowledge from MKL I and II to a design task. This is then evaluated and must be passed for successful participation.

Workload:

Presence time: 21 h

Self study: 51 h

Literature
Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von
Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

Grundlagen von Maschinenelementen für Antriebsaufgaben;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8)

T 7.152 Course: Mechanical Design Basics I, Tutorial [T-MACH-110364]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101299 - Mechanical Design

Type	Credits	Recurrence	Version
Completed coursework	1	Each winter term	1

Events					
WS 19/20	2145132	Tutorials Mechanical Design Basics I	1 SWS	Practice (Ü)	Albers, Matthiesen, Behrendt, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-110364	Mechanical Design Basics I, Tutorial		Prüfung (PR)	Albers, Matthiesen

Competence Certificate
To pass the preliminary work, attendance at 3 workshop sessions of the MKL1 transmission workshop and the passing of a colloquium at the beginning of each workshop are prerequisites.

Prerequisites
None

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

V Tutorials Mechanical Design Basics I

2145132, WS 19/20, 1 SWS, Language: German, Open in study portal

Practice (Ü)

Literature
Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

Grundlagen von Maschinenelementen für Antriebsaufgaben;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

CAD:

3D-Konstruktion mit Pro/Engineer - Wildfire, Paul Wyndorps, Europa Lehrmittel, ISBN: 978-3-8085-8948-9

Pro/Engineer Tipps und Techniken, Wolfgang Berg, Hanser Verlag, ISBN: 3-446-22711-3 (für Fortgeschrittene)

T 7.153 Course: Mechanical Design Basics II, Tutorial [T-MACH-110365]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101299 - Mechanical Design

Type	Credits	Recurrence	Version
Completed coursework	1	Each summer term	1

Events					
SS 2020	2146132	Tutorials Mechanical Design Basics II	2 SWS	Practice (Ü)	Albers, Matthiesen, Mitarbeiter

Competence Certificate
CIW/ VT/ IP-M/ WiING / NWT/ MATH/ MWT: For passing the prerequisite it is necessary that a design task is successfully completed as a technical hand drawing

MIT: To pass the preliminary examination, attendance at workshop sessions and a colloquium at the beginning of each workshop are required.

Prerequisites
None

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

V Tutorials Mechanical Design Basics II

2146132, SS 2020, 2 SWS, Language: German, Open in study portal

Practice (Ü)

Content
Design

Dimensioning

Component connections

Bolted connection

Workload:

MIT Students:

Presence time: 18 h

Self study: 30 h

CIW/ VT/ IP-M/ WiING / NWT/ MATH/ MWT

Presence time: 10,5 h

Self study: 37,5 h

Literature
Konstruktionselemente des Maschinenbaus - 1 und 2
Grundlagen der Berechnung und Gestaltung von Maschinenelementen;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X

Grundlagen von Maschinenelementen für Antriebsaufgaben;
Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

CAD:

3D-Konstruktion mit Pro/Engineer - Wildfire, Paul Wyndorps, Europa Lehrmittel, ISBN: 978-3-8085-8948-9

Pro/Engineer Tipps und Techniken, Wolfgang Berg, Hanser Verlag, ISBN: 3-446-22711-3 (für Fortgeschrittene)

T 7.154 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
SS 2020	76-T-MACH-105177	Metal Forming		Prüfung (PR)	Schulze

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 7.155 Course: Microactuators [T-MACH-101910]

Responsible: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

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 7.156 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, Lehr
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 7.157 Course: Mobility and Infrastructure [T-BGU-101791]

Responsible: Prof. Dr.-Ing. Ralf Roos
Prof. Dr.-Ing. Peter Vortisch

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: M-BGU-101067 - Mobility and Infrastructure

Type	Credits	Recurrence	Version
Written examination	9	Each term	2

Events					
SS 2020	6200404	Spatial Planning and Planning Law	2 SWS	Lecture (V)	Wilske
SS 2020	6200405	Exercises to Spatial Planning and Planning Law	1 SWS	Practice (Ü)	Wilske, Mitarbeiter/ innen
SS 2020	6200406	Transportation Systems	2 SWS	Lecture (V)	Vortisch
SS 2020	6200407	Exercises to Transportation Systems	SWS	Practice (Ü)	Vortisch, Mitarbeiter/ innen
SS 2020	6200408	Design Basics in Highway Engineering	2 SWS	Lecture (V)	Roos, Zimmermann
SS 2020	6200409	Exercises to Design Basics in Highway Engineering	SWS	Practice (Ü)	Plachkova-Dzhurova, Zimmermann
Exams					
WS 19/20	8234101791	Mobility and Infrastructure		Prüfung (PR)	Roos

Competence Certificate
written exam, 150 min.

Prerequisites
None

Recommendation
For students from the KIT-Department of Economics and Management it is recommended to take part in the excercises.

Annotation
none

T 7.158 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 7.159 Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research

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

Events					
SS 2020	2550490	Modellieren und OR-Software: Einführung	3 SWS	Practical course (P)	Nickel, Pomes

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
Firm knowledge of the contents from the lecture *Introduction to Operations Research I* [2550040] of the module *Operations Research*.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered 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: Einführung

2550490, SS 2020, 3 SWS, Language: German, Open in study portal

Practical course (P)

Content
After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, ...), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis. Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

T 7.160 Course: Modelling and Identification [T-ETIT-100699]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101156 - Control Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2303166	Modelling and Identification	2 SWS	Lecture (V)	Hohmann
WS 19/20	2303168	Modelling and Identification (Tutorial to 2303166)	1 SWS	Practice (Ü)	Strehle
Exams					
WS 19/20	7303166	Modelling and Identification		Prüfung (PR)	Hohmann

Prerequisites
none

T 7.161 Course: Nanotechnology with Clusterbeams [T-MACH-102080]

Responsible: Dr. Jürgen Gspann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

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 7.162 Course: Nonlinear Optimization I [T-WIWI-102724]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR
M-WIWI-103278 - Optimization under Uncertainty

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 7.163 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-101414 - Methodical Foundations of OR

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 7.164 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodical Foundations of OR

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 7.165 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

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 7.166 Course: Operative CRM [T-WIWI-102597]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101422 - Specialization in Customer Relationship Management
M-WIWI-101460 - CRM and Service Management

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

Events					
WS 19/20	2540522	Operative CRM	2 SWS	Lecture (V)	Geyer-Schulz
WS 19/20	2540523	Übung Operatives CRM	1 SWS	Practice (Ü)	Schweigert
Exams					
WS 19/20	7900145	Operative CRM		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
The attendance of courses Customer Relationship Management and Analytical CRM is advised.

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

V Operative CRM

2540522, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature

Jill Dyché. The CRM Handbook: A Business Guide to Customer Relationship Management. Addison-Wesley, Boston, 2 edition, 2002.

Ronald S. Swift. Accelerating Customer Relationships: Using CRM and RelationshipTechnologies. Prentice Hall, Upper Saddle River, 2001.

Weiterführende Literatur:

Alex Berson, Kurt Thearling, and Stephen J. Smith. Building Data Mining Applications for CRM. Mc Graw-Hill, New York, 2000.

Stanley A. Brown. Customer Relationship Management: A Strategic Imperative in theWorld of E-Business. John Wiley, Toronto, 2000.

Dimitris N. Chorafas. Integrating ERP, CRM, Supply Chain Management, and SmartMaterials. Auerbach Publications, Boca Raton, Florida, 2001.

Keith Dawson. Call Center Handbook: The Complete Guide to Starting, Running, and Improving Your Call Center. CMP Books, Gilroy, CA, 4 edition, 2001.

Andreas Eggert and Georg Fassot. eCRM – Electronic Customer Relationship Management: Anbieter von CRM-Software im Vergleich. Schäffer-Poeschel, Stuttgart, 2001.

Seth Godin. Permission Marketing. Kunden wollen wählen können. FinanzBuch Verlag, München, 1999.

Paul Greenberg. CRM at the Speed of Light: Capturing and Keeping Customers in Internet Real Time. Osborne/McGraw-Hill, 3rd ed. edition, Aug 2004.

Philip Kotler. Marketing Management: Millennium Edition. Prentice Hall, Upper Saddle River, 10 edition, 2000.

Don Peppers and Martha Rogers. The One To One Future. Currency Doubleday, New York, 1997.

Duane E. Sharp. Customer Relationship Management Systems Handbook. Auerbach, 2002.

Len Silverston. The Data Model Resource Book: A Library of Universal Data Models for All Entreprises, volume 1. John Wiley & Sons, 2001.

Toby J. Teorey. Database Modeling and Design. Morgan Kaufmann, San Francisco, 3 edition, 1999.

Chris Todman. Designing a Data Warehouse : Supporting Customer Relationship Management. Prentice Hall, Upper Saddle River, 1 edition, 2001.

T 7.167 Course: Optimization under Uncertainty [T-WIWI-106545]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-103278 - Optimization under Uncertainty

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 7.168 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
SS 2020	7309486	Optoelectronic Components		Prüfung (PR)	Freude

Prerequisites
none

T 7.169 Course: Personnel Policies and Labor Market Institutions [T-WIWI-102908]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101513 - Human Resources and Organizations
M-WIWI-101668 - Economic Policy I

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

Events					
SS 2020	2573001	Personnel Policies and Labor Market Institutions	2 SWS	Lecture (V)	Nieken
SS 2020	2573002	Übungen zu Personalpolitik und Arbeitsmarktinstitutionen	1 SWS	Practice (Ü)	Nieken, Mitarbeiter
Exams					
WS 19/20	7900202	Personnel Policies and Labor Market Institutions		Prüfung (PR)	Nieken

Competence Certificate
The assessment of this course is a written examination (60 min) according to §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
Completion of module Business Administration is recommended.
Basic knowledge of microeconomics, game theory, and statistics is recommended.

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

V Personnel Policies and Labor Market Institutions

2573001, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The students acquire knowledge about the process and the strategic aspects of collective bargaining about wages. They analyze selected aspects of corporate governance and co-determination in Germany. The lecture also addresses questions of personnel politics and labor market discrimination. Microeconomic and behavioral approaches as well as empirical data is used and evaluated critically.

Aim

The student

- understands the process and role of agents in collective wage bargaining.
- analyzes strategic decisions in the context of corporate governance.
- understands the concept of co-determination in Germany.
- challenges statements that evaluate certain personnel politics.

Workload

The total workload for this course is approximately 135 hours.

Lecture 32h

Preparation of lecture 52h

Exam preparation 51h

Literature

Arbeitsmarktökonomik, W. Franz, Springer, 2013

T 7.170 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 7.171 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 7.172 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 7.173 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 7.174 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 7.175 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 7.176 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 7.177 Course: Physical Basics of Laser Technology [T-MACH-102102]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis 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 7.178 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

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 7.179 Course: Platform Economy [T-WIWI-109936]

Responsible: Dr. Verena Dorner
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101421 - Supply Chain Management
M-WIWI-101434 - eBusiness and Service Management
M-WIWI-104911 - Information Systems & Digital Business: Interaction
M-WIWI-104912 - Information Systems & Digital Business: Platforms

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	3

Events					
WS 19/20	2540468	Platform Economy	2 SWS	Lecture (V)	Weinhardt, Dann
WS 19/20	2540469	Übung zu Platform Economy	SWS	Practice (Ü)	Dann, Richter
Exams					
WS 19/20	7900213	Platform Economy		Prüfung (PR)	Weinhardt

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. Details of the grades will be announced at the beginning of the course.

Prerequisites
see below

Recommendation
None

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

V Platform Economy

2540468, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature

- Bundesministerium für Wirtschaft und Energie (2017). „Kompetenzen für eine digitale Sourveränität“(abrufbar unter https://www.bmwi.de/Redaktion/DE/Publikationen/Studien/kompetenzen-fuer-eine-digitale-souveraenitaet.html)
- Bundesministerium für Wirtschaft und Energie (2017). „Weißbuch Digitale Plattformen.“ (abrufbar unter https://www.bmwi.de/Redaktion/DE/Publikationen/Digitale-Welt/weissbuch-digitale-plattformen.pdf?__blob=publicationFile&v=8)
- Chuen, D.L.K., ed. 2015. “Handbook of digital currency: Bitcoin, innovation, financial instruments, and big data,” Academic Press.
- Easley, D., and Kleinberg, J. 2010. “Network Effects,” in Networks, Crowds, and Markets: Reasoning about a Highly Connected World, Cambridge University Press, pp. 509–542.
- Eisenmann, T., Parker, G., and Van Alstyne, M. W. 2006. “Strategies for two-sided markets,” Harvard Business Review 84(10), pp. 1–11.
- Gassmann, O., Frankenberger, K., and Csik, M. 2013. Geschäftsmodelle entwickeln: 55 innovative Konzepte mit dem St. Galler Business Model Navigator, Hanser.
- Wattenhofer, R. 2016. “The science of the blockchain.” CreateSpace Independent Publishing Platform.
- Roth, A. 2002. “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., 1999. “Topics in Microeconomics - Industrial Organization, Auctions, and Incentives,” Cambridge, Cambridge University Press.
- Teubner, T., and Hawlitschek, F. (in press). “The economics of P2P online sharing,” in The Sharing Economy: Possibilities, Challenges, and the way forward, Praeger Publishing.

T 7.180 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-101270 - Product Lifecycle Management

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 7.181 Course: PLM-CAD Workshop [T-MACH-102153]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

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 7.182 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-101262 - Emphasis 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 7.183 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-101262 - Emphasis 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 7.184 Course: Power Generation [T-ETIT-101924]

Responsible: Dr.-Ing. Bernd Hoferer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101165 - Energy Generation and Network Components

Type	Credits	Recurrence	Version
Oral examination	3	Each winter term	2

Events					
WS 19/20	2307356	Power Generation	2 SWS	Lecture (V)	Hoferer
Exams					
WS 19/20	7307356	Power Generation		Prüfung (PR)	Hoferer
SS 2020	7307356	Power Generation		Prüfung (PR)	Hoferer

Prerequisites
none

T 7.185 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-102379 - Power Network

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 7.186 Course: Practical Seminar Interaction [T-WIWI-109935]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104911 - Information Systems & Digital Business: Interaction

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

Events					
WS 19/20	2540555	Practical Seminar: Digital Services (Ba)	3 SWS	Lecture (V)	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.

T 7.187 Course: Practical Seminar Platforms [T-WIWI-109937]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104912 - Information Systems & Digital Business: Platforms

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

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.

T 7.188 Course: Practical Seminar Servitization [T-WIWI-109939]

Responsible: Prof. Dr. Alexander Mädche
Prof. Dr. Gerhard Satzger

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104913 - Information Systems & Digital Business: Servitization

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each term	1

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.

T 7.189 Course: Practical Seminar: Digital Services [T-WIWI-110888]

Responsible: Prof. Dr. Gerhard Satzger
Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102752 - Fundamentals of Digital Service Systems

Type	Credits	Recurrence	Version
Examination of another type	4,5	Each summer term	1

Events					
WS 19/20	2540555	Practical Seminar: Digital Services (Ba)	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
The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

T 7.190 Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology

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 7.191 Course: Problem Solving, Communication and Leadership [T-WIWI-102871]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101425 - Strategy and Organization
M-WIWI-101513 - Human Resources and Organizations

Type	Credits	Recurrence	Version
Written examination	2	Each summer term	1

Events					
WS 19/20	2577910	Problem solving, communication and leadership	1 SWS	Lecture (V)	Lindstädt
SS 2020	2577910	Problem solving, communication and leadership	1 SWS	Lecture (V)	Lindstädt
Exams					
WS 19/20	7900070	Problem Solving, Communication and Leadership		Prüfung (PR)	Lindstädt

Competence Certificate
The assessment consists of a written exam (30 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 Problem solving, communication and leadership

2577910, WS 19/20, 1 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course deals with various aspects of problem solving and communication processes and is divided into two parts. The first part of the course addresses the fundamental steps in the problem-solving process; namely, problem identification, problem structuring, problem analysis and communication of solution. Ideas for structuring problem solving processes will be discussed and the perquisites for and principles of structured communication based on charts and presentations will be explained. The second part of the course addresses important concepts in leadership, including the context-specificity of influence, the choice of leader and the characteristics of employees. The course content reflects current issues in management and communication practice and is oriented toward the practical application of theoretical insights to these issues. In this respect, the course aims to develop interdisciplinary skills.

Learning Objectives:

After passing this course students are able to

- structure problem solving processes.
- apply the principles of focused communication based on charts and presentations.
- understand leadership in the context of situation and personality.

Recommendations:

None.

Workload:

The total workload for this course is approximately 60 hours. For further information see German version.

Assessment:

The assessment consists of a written exam (30 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.

Literature
Verpflichtende Literatur:
Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.
Ergänzende Literatur:
- Hungenberg, Harlad: Problemlösung und Kommunikation, 3. Aufl. München 2010
- Zelazny, Gene; Delker, Christel: Wie aus zahlen Bilder werden, 6. Aufl. Wiesbaden 2008
- Minto, Barbara: Das Prinzip der Pyramide: Ideen klar, verständlich und erfolgreich kommunizieren. 2005

V

Problem solving, communication and leadership

2577910, SS 2020, 1 SWS, Language: German, Open in study portal

Lecture (V)

Literature
Verpflichtende Literatur:
Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.
Ergänzende Literatur:
- Hungenberg, Harlad: Problemlösung und Kommunikation, 3. Aufl. München 2010
- Zelazny, Gene; Delker, Christel: Wie aus zahlen Bilder werden, 6. Aufl. Wiesbaden 2008
- Minto, Barbara: Das Prinzip der Pyramide: Ideen klar, verständlich und erfolgreich kommunizieren. 2005

T 7.192 Course: Procedures of Remote Sensing [T-BGU-103542]

Responsible: Dr.-Ing. Uwe Weidner
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Version
Oral examination	3	2

T 7.193 Course: Procedures of Remote Sensing, Prerequisite [T-BGU-101638]

Responsible: Dr.-Ing. Uwe Weidner
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Completed coursework	1	Each summer term	1

Events					
SS 2020	6020244	Fernerkundungsverfahren, Übung	1 SWS	Practice (Ü)	Weidner
Exams					
SS 2020	8284101638	Procedures of Remote Sensing, Prerequisite		Prüfung (PR)	Weidner

Prerequisites
None

Recommendation
None

Annotation
None

T 7.194 Course: Process Fundamentals by the Example of Food Production [T-CIWVT-106058]

Responsible: Dr. Volker Gaukel
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-WIWI-101839 - Additional Fundamentals of Engineering

Type	Credits	Version
Written examination	3	1

Events					
WS 19/20	22213	Verfahrenstechnische Grundlagen am Beispiel der Lebensmittelverarbeitung (für LmCh, WiWi)	2 SWS	Lecture (V)	Gaukel
Exams					
WS 19/20	7220007	Process fundamentals by the example of food production		Prüfung (PR)	Gaukel

Prerequisites
none

T 7.195 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 7.196 Course: Product Lifecycle Management [T-MACH-105147]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2121350	Product Lifecycle Management	2 SWS	Lecture (V)	Ovtcharova
Exams					
WS 19/20	76-T-MACH-105147	Product Lifecycle Management		Prüfung (PR)	Ovtcharova

Competence Certificate
Writen examination 90 min.

Prerequisites
None

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

V Product Lifecycle Management

2121350, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course includes:

- Basics for product data management and data exchange
- IT system solutions for Product Lifecycle Management (PLM)
- Economic viability analysis and implementation problems
- Illustrative scenario for PLM using the example of the institute's own I4.0Lab

After successful attendance of the course, students can:

- identify the challenges of data management and exchange and describe solution concepts for these challenges.
- clarify the management concept PLM and its goals and highlight the economic benefits.
- explain the processes required to support the product life cycle and describe the most important business software systems (PDM, ERP, ...) and their functions.

Literature
Vorlesungsfolien.

V. Arnold et al: Product Lifecycle Management beherrschen, Springer-Verlag, Heidelberg, 2005.

J. Stark: Product Lifecycle Management, 21st Century Paradigm for Product Realisation, Springer-Verlag, London, 2006.

A. W. Scheer et al: Prozessorientiertes Product Lifecycle Management, Springer-Verlag, Berlin, 2006.

J. Schöttner: Produktdatenmanagement in der Fertigungsindustrie, Hanser-Verlag, München, 1999.

M.Eigner, R. Stelzer: Produktdaten Management-Systeme, Springer-Verlag, Berlin, 2001.

G. Hartmann: Product Lifecycle Management with SAP, Galileo press, 2007.

K. Obermann: CAD/CAM/PLM-Handbuch, 2004.

T 7.197 Course: Product, Process and Resource Integration in the Automotive Industry [T-MACH-102155]

Responsible: Dr.-Ing. Sama Mbang
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2020	2123364	Product, Process and Resource Integration in the Automotive Industry	2 SWS	Lecture (V)	Mbang

Competence Certificate
Oral examination 20 min.

Prerequisites
None

Annotation
Limited number of participants.

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

V Product, Process and Resource Integration in the Automotive Industry

2123364, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content

- Overview of product development in the automotive sector (process- and work cycle, IT-Systems)
- Integrated product models in the automotive industry (product, process and resource)
- New CAx modeling methods (intelligent feature technology, templates & functional modeling)
- Automation and knowledge-based mechanism for product design and production planning
- Product development in accordance with defined process and requirement (3D-master principle, tolerance models)
- Concurrent Engineering, shared working
- Enhanced concepts: the digital and virtual factory (application of virtual technologies and methods in the product development)

Literature
Vorlesungsfolien

T 7.198 Course: Production Economics and Sustainability [T-WIWI-102820]

Responsible: Prof. Dr. Frank Schultmann
Dr.-Ing. Rebekka Volk
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101437 - Industrial Production I

Type	Credits	Recurrence	Version
Written examination	3,5	Each winter term	1

Events					
WS 19/20	2581960	Production Economics and Sustainability	2 SWS	Lecture (V)	Volk
Exams					
WS 19/20	7981960	Production Economics and Sustainability		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.

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

V Production Economics and Sustainability

2581960, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The analysis and management of material flows on the company level and above will be the focus of this lecture. Herein, the discussion will be about cost-effective and environmentally acceptable steps to avoid, abate and recycle emissions and waste as well as ways of efficient resources handling. As methods material flow analysis (MFA), life cycle assessment (LCA) and OR methods, e.g. for decision support, are introduced.

Topics:
- regulations related to materials and substances
- raw materials, reserves and their availabilities/lifetimes
- material and substance flow analysis (MFA/SFA)
- material related ecoprofiles, e.g. Carbon Footprint
- LCA
- resource efficiency
- emission abatement
- waste management and closed-loop recycling
- raw material oriented production systems
- environmental management (EMAS, ISO 14001, Ecoprofit), eco-controlling

Literature
wird in der Veranstaltung bekannt gegeben

T 7.199 Course: Project in Applied Remote Sensing [T-BGU-101814]

Responsible: Prof. Dr.-Ing. Stefan Hinz
Dr.-Ing. Uwe Weidner

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Version
Completed coursework	1	1

Events					
SS 2020	6020245	Projektübung angewandte Fernerkundung	2 SWS	Practice (Ü)	Assistenten, Hinz
Exams					
SS 2020	8284101814	Project in Applied Remote Sensing		Prüfung (PR)	Weidner

T 7.200 Course: Project Management [T-BGU-101675]

Responsible: Prof. Dr.-Ing. Shervin Haghsheno
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-101004 - Fundamentals of Construction

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	6200106	Projektmanagement	2 SWS	Lecture / Practice (VÜ)	Haghsheno, Schneider
Exams					
WS 19/20	8230101675	Project Management		Prüfung (PR)	Haghsheno, Schneider

Competence Certificate
written exam with 60 minutes

Prerequisites
None

Recommendation
None

Annotation
None

T 7.201 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
SS 2020	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 7.202 Course: Public Law I & II [T-INFO-110300]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: M-INFO-105084 - Public and Civil Law

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
WS 19/20	24016	Öffentliches Recht I - Grundlagen	2 SWS	Lecture (V)	Barczak
SS 2020	24520	Öffentliches Recht II - Öffentliches Wirtschaftsrecht	2 SWS	Lecture (V)	Eichenhofer
Exams					
WS 19/20	7500138	Public Law I & II		Prüfung (PR)	Barczak
SS 2020	7500298	Public Law I & II		Prüfung (PR)	Eichenhofer

T 7.203 Course: Public Revenues [T-WIWI-102739]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101403 - Public Finance
M-WIWI-101499 - Applied Microeconomics
M-WIWI-101668 - Economic Policy I

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 7.204 Course: Public Sector Finance [T-WIWI-109590]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101403 - Public Finance

Type	Credits	Recurrence	Version
Written examination	4,5	Each winter term	2

Events					
WS 19/20	2560136		3 SWS	Lecture (V)	Wigger, Groh

Competence Certificate
The assessment consists of a written exam (60 min.).

Prerequisites
T-WIWI-107763 "Municipal Finance" must not be selected.

Annotation
Previous title until winter semester 2018/19 "Municipal Finance".

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

V 2560136, WS 19/20, 3 SWS, Language: German, Open in study portal — Lecture (V)

Content
The course *Municipal Finance* addresses the theory and policy of municipal revenues and spending including grants, municipal revenue equalisation, taxation as well as municipal and public enterprises.

At the beginning of the course, fundamental concepts of taxation theory as well as key elements of the German taxation system are introduced. The allocative and distributive effects of different taxation methods are examined thereafter and are combined within the theory of optimal taxation. The following chapter is concerned with municipal borrowing and illustrates ways to acquire additional funding. After addressing the extent, structure and variety of municipal borrowing, macroeconomic theories are introduced and applied to the municipal sector. In the course of this final chapter, special attention will be paid to the long term consequences and the sustainability of municipal borrowing as a means of budgeting.

Learning goals:

The students:

- are familiar with the theory and policy of municipal revenues and spending.
- are able to evaluate the allocative and distributive effects of different kinds of municipal revenues and spending.
- understand the extent, structure and variety of municipal budgeting and are able to assess long term consequences of municipal revenues and spending.

Workload:

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

Literature

- Ade, K., Notheis, K. & Schmid, H. (2011). *Kommunales Wirtschaftsrecht in Baden Württemberg*. Boorberg-Verlag.
- Aker, B., Hafner, W. & Notheis, K. (2012). *Gemeindeordnung Baden-Württemberg*(Kommentar). Boorberg-Verlag.
- Groh, M. (1994).Kommunalleasing und Investorenfinanzierung als Private Public Partnership.*Stadt und Gemeinde*, 49. Jahrgang, 09/94.
- Wigger, B. U. (2006).*Grundzüge der Finanzwissenschaft*. Springer-Verlag.
- Diverse Veröffentlichungen des Innenministeriums und Finanzministeriums Baden-Württemberg.

T 7.205 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 7.206 Course: Python for Empirical Finance [T-WIWI-110217]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105035 - Empirical Finance

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

Events					
WS 19/20	2500014	Python for Empirical Finance	2 SWS	Practical course (P)	Ulrich
Exams					
WS 19/20	00174	Python for Empirical Finance		Prüfung (PR)	Ulrich

Competence Certificate
The assessment is carried out in form of six biweekly 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.

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

V Python for Empirical Finance

2500014, 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 computational risk and asset management.

The course covers several topics from a programming perspective, among them:

Mean-Variance Portfolio Optimization

Modeling Distribution of Asset Returns with Factor Models and ARMA-GARCH

Monte-Carlo Simulation

Parameter Estimation with Maximum Likelihood and Regressions

The course introduces students to Python, one of the most popular high-level programming languages in data analytics. After an introduction to the basic concepts, students will soon begin to solve problems related to the agenda of the lecture 'Empirical Finance'. This enables them to work with financial data, perform various statistical analysis and estimate their own time series models.

T 7.207 Course: Quality Management [T-MACH-102107]

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

Part of: 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
SS 2020	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 7.208 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 7.209 Course: Real Estate Management I [T-WIWI-102744]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101466 - Real Estate Management

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

Events					
WS 19/20	2586400	Real Estate Management I	2 SWS	Lecture (V)	Lützkendorf, Worschech
WS 19/20	2586401	Übungen zu Real Estate Management I	2 SWS	Practice (Ü)	Worschech
Exams					
WS 19/20	7900249	Real Estate Management I		Prüfung (PR)	Lützkendorf

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Annotation
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

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

V Real Estate Management I

2586400, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course Real Estate Management I deals with questions concerning the economy of a single building througout its lifecycle. Among other topics this includes project development, location and market studies, german federal building codes as well as finance and assessment of economic efficiency.
The tutorial recesses the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

The course Real Estate Management I deals with questions concerning the economy of a single building througout its lifecycle. Among other topics this includes project development, location and market studies, german federal building codes as well as finance and assessment of economic efficiency.
The tutorial recesses the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

Recommendations:

A combination with the module *Design Construction and Assessment of Green Buildings I* [WW3BWLOOW1] is recommended.

Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

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

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Gondring (Hrsg.): "Immobilienwirtschaft: Handbuch für Studium und Praxis". ISBN 3-8006-2989-5. Vahlen 2004
- Kühne-Büning (Hrsg.): "Grundlagen der Wohnungs- und Immobilienwirtschaft". ISBN 3-8314-0706-1. Knapp & Hammonia-Verlag 2005
- Schulte (Hrsg.): "Immobilienökonomie Bd. I". ISBN 3-486-25430-8. Oldenbourg 2000

T 7.210 Course: Real Estate Management II [T-WIWI-102745]

Responsible: Prof. Dr.-Ing. Thomas Lützkendorf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101466 - Real Estate Management

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

Events					
SS 2020	2585400	Real Estate Management II	2 SWS	Lecture (V)	Lützkendorf, Worschech
SS 2020	2585401	Übung zu Real Estate Management II	2 SWS	Practice (Ü)	Worschech

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Reexaminations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
A combination with the module*Design Construction and Assessment of Green Buildings I*is recommended.
Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

Annotation
The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

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

V Real Estate Management II

2585400, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The course Real Estate Management II gives special attention to topics in connection to the management of large real estate portfolios. This especially includes property valuation, market and object rating, maintenance and modernization, as well as real estate portfolio and risk management. The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems.

The course is replenished by excursions and guest lectures by practicioners out of the real estate business.

The student

- has an in-depth knowledge on the economic classification and significance of the real estate industry
- has a critical understanding of essential theories, methods and instruments of the real estate industry
- is able to analyze and evaluate activity areas and functions in real estate companies as well as to prepare or to take decisions

Recommendations:

A combination with the module *Design Construction and Assessment of Green Buildings I* [WW3BWLOOW1] is recommended.

Furthermore it is recommeded to choose courses of the following fields

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

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

The **assessment** consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place two times only in the semester in which the lecture is takes place (summer semester). Reexaminations are offered at every ordinary examination date.

Literature
Weiterführende Literatur:

- Gondring (Hrsg.): "Immobilienwirtschaft: Handbuch für Studium und Praxis". ISBN 3-8006-2989-5. Vahlen 2004
- Kühne-Büning (Hrsg.): "Grundlagen der Wohnungs- und Immobilienwirtschaft". ISBN 3-8314-0706-1. Knapp & Hammonia-Verlag 2005
- Schulte (Hrsg.): "Immobilienökonomie Bd. I". ISBN 3-486-25430-8. Oldenbourg 2000

T 7.211 Course: Remote Sensing, Exam [T-BGU-101636]

Responsible: Prof. Dr.-Ing. Stefan Hinz
Dr.-Ing. Uwe Weidner

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2020	6020241	Fernerkundungssysteme	1 SWS	Lecture (V)	Hinz
SS 2020	6020242	Fernerkundungssysteme, Übung	1 SWS	Practice (Ü)	Weidner
SS 2020	6020243	Fernerkundungsverfahren	2 SWS	Lecture (V)	Weidner
SS 2020	6020244	Fernerkundungsverfahren, Übung	1 SWS	Practice (Ü)	Weidner
Exams					
SS 2020	8284101636	Remote Sensing, exam		Prüfung (PR)	Weidner, Hinz

Recommendation
None

T 7.212 Course: Renewable Energy-Resources, Technologies and Economics [T-WIWI-100806]

Responsible: PD Dr. Patrick Jochem
Prof. Dr. Russell McKenna
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101464 - Energy Economics

Type	Credits	Recurrence	Version
Written examination	3,5	Each winter term	3

Events					
WS 19/20	2581012	Renewable Energy – Resources, Technologies and Economics	2 SWS	Lecture (V)	McKenna, Jochem
Exams					
WS 19/20	7981012	Renewable Energy-Resources, Technologies and Economics		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min., in English, answers in English or German).

Prerequisites
None.

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

V Renewable Energy – Resources, Technologies and Economics

2581012, WS 19/20, 2 SWS, Language: English, Open in study portal — **Lecture (V)**

Content
1. General introduction: Motivation, Global situation
2. Basics of renewable energies: Energy balance of the earth, potential definition
3. Hydro
4. Wind
5. Solar
6. Biomass
7. Geothermal
8. Other renewable energies
9. Promotion of renewable energies
10. Interactions in systemic context
11. Excursion to the "Energieberg" in Mühlburg

Learning Goals:
The student

- understands the motivation and the global context of renewable energy resources.
- gains detailed knowledge about the different renewable resources and technologies as well as their potentials.
- understands the systemic context and interactions resulting from the increased share of renewable power generation.
- understands the important economic aspects of renewable energies, including electricity generation costs, political promotion and marketing of renewable electricity.
- is able to characterize and where required calculate these technologies.

Literature
Weiterführende Literatur:

- Kaltschmitt, M., 2006, Erneuerbare Energien : Systemtechnik, Wirtschaftlichkeit, Umweltaspekte, aktualisierte, korrigierte und ergänzte Auflage Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg.
- Kaltschmitt, M., Streicher, W., Wiese, A. (eds.), 2007, Renewable Energy: Technology, Economics and Environment, Springer, Heidelberg.
- Quaschning, V., 2010, Erneuerbare Energien und Klimaschutz : Hintergründe - Techniken - Anlagenplanung – Wirtschaftlichkeit München : Hanser, III.2., aktualis. Aufl.
- Harvey, D., 2010, Energy and the New Reality 2: Carbon-Free Energy Supply, Eathscan, London/Washington.
- Boyle, G. (ed.), 2004, Renewable Energy: Power for a Sustainable Future, 2nd Edition, Open University Press, Oxford.

T 7.213 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

Type	Credits	Recurrence	Version
Oral examination	3	Each term	1

Competence Certificate
Oral examination

Prerequisites
none

T 7.214 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-101816 - 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 7.215 Course: Seminar in Business Administration (Bachelor) [T-WIWI-103486]

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

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

Events					
WS 19/20	2500028	Seminar in Empirical Finance	2 SWS	Seminar (S)	Ulrich
WS 19/20	2530580	Seminar in Finance	2 SWS	Seminar (S)	Uhrig-Homburg, Mitarbeiter
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	2540524	Bachelor Seminar aus Data Science	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	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar (S)	Terzidis, Ziegler, González
WS 19/20	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar (S)	Böhrer, Terzidis
WS 19/20	2573010	Seminar: Human Resources and Organizations (Bachelor)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 19/20	2573011	Seminar: Human Resource Management (Bachelor)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
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	2530293	Seminar in Finance (Bachelor, Prof. Ruckes)	2 SWS	Seminar (S)	Ruckes, Luedecke, Hoang, Benz, Schubert, Strych, Silbereis

SS 2020	2530374	Data-Driven Investments	2 SWS	Seminar (S)	Ulrich
SS 2020	2530580	Seminar in Finance	2 SWS	Seminar (S)	Uhrig-Homburg, Eska, Schuster, Eberbach, Reichenbacher
SS 2020	2540524	Bachelorseminar aus Data Science	2 SWS	Seminar (S)	Geyer-Schulz, Schweigert, Schweizer
SS 2020	2545010	Entrepreneurship Basics (Track 1)	2 SWS	Seminar (S)	Lau, Terzidis
SS 2020	2545011	Entrepreneurship Basics (Track 2)	2 SWS	Seminar (S)	Terzidis, Böhrer
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	2573010	Seminar Human Resources and Organizations (Bachelor)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2020	2573011	Seminar Human Resource Management (Bachelor)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
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	7900085	Entrepreneurship Basics (Track 1)		Prüfung (PR)	Terzidis
WS 19/20	7900087	Entrepreneurship Basics (Track 2)		Prüfung (PR)	Terzidis
WS 19/20	7900141	Innovation Processes Live		Prüfung (PR)	Weissenberger-Eibl, Beyer
WS 19/20	7900157	Seminar Human Resources and Organizations (Bachelor)		Prüfung (PR)	Nieken
WS 19/20	7900161	Seminar Human Resource Management (Bachelor)		Prüfung (PR)	Nieken
WS 19/20	7900165	Seminar Digital Experience and Participation		Prüfung (PR)	Weinhardt
WS 19/20	7900168	Bachelor Seminar in Data Science		Prüfung (PR)	Geyer-Schulz
WS 19/20	7900175	Seminar in Finance (Bachelor)		Prüfung (PR)	Uhrig-Homburg
WS 19/20	7900203	Seminar in Finance		Prüfung (PR)	Uhrig-Homburg
WS 19/20	7900233	Literature Review Seminar: Information Systems and Service Design (Seminar)		Prüfung (PR)	Mädche
WS 19/20	7900250	Seminar Strategic Management (Bachelor)		Prüfung (PR)	Lindstädt
WS 19/20	7900327	Electronic Markets & User behavior (Seminar)		Prüfung (PR)	Weinhardt
WS 19/20	7900329	Seminar in Business Administration (Bachelor)		Prüfung (PR)	Ulrich
WS 19/20	79-2579919-B	Seminar Management Accounting - Special Topics (Bachelor)		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	7900056	Entrepreneurship Basics (Track 1)	Prüfung (PR)	Terzidis
SS 2020	7900057	Entrepreneurship Basics (Track 2)	Prüfung (PR)	Terzidis
SS 2020	7900093	Seminar in Business Administration A	Prüfung (PR)	Weinhardt
SS 2020	7900220	Seminar in Business Administration (Bachelor)	Prüfung (PR)	Ulrich
SS 2020	797981990	Seminar in Production and Operations Management IV	Prüfung (PR)	Schultmann
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 in Empirical Finance** **Seminar (S)**
2500028, WS 19/20, 2 SWS, Language: English, Open in study portal

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 **Bachelor Seminar aus Data Science** **Seminar (S)**
2540524, WS 19/20, 2 SWS, Language: German, Open in study portal

Literature
Weiterführende Literatur:

- W. Thomson. A Guide for the Young Economist. The MIT Press, 2001
- D.J. Brauner, H.-U. Vollmer. Erfolgreiches wissenschaftliches Arbeiten. Verlag Wissenschaft & Praxis, 2004
- University of Chicago Press. The Chicago Manual of Style. University of Chicago Press, 13th ed., 1982
- American Psychological Association. Concise of Rules of APA Style. American Psychological Association, 2005
- American Psychological Association. Publication Manual of the American Psychological Association. American Psychological Association, 2001

V Entrepreneurship Basics (Track 1)

2545010, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
The seminar introduces students to basic concepts of business planning for entrepreneurs. This involves concepts for the concretization of business ideas (development of business models), market potential estimation, resource planning, etc.) as well as the creation of an executable business plan (with or without VC financing).

The primary focus of the seminar is on working with the Business Model Canvas and developing a value proposition.

Learning objectives:

After attending, students have learned how to use a structured process to take the first steps in starting a business to identify and minimize their most important risks. In particular, they have practical experience in identifying and validating 1) relevant customer issues, 2) designing and testing solutions to these problems, 3) targeting and assessing their accessibility, and 4) their willingness to pay. In doing so, they have learned to know and apply the business model canvas, methods for developing value propositions, rapid prototyping and target group interviews. In addition, they have learned to work efficiently in a team through the use of communication strategies.

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

V Entrepreneurship Basics (Track 2)

2545011, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
):

The seminar introduces students to basic concepts of business planning for entrepreneurs. This involves concepts for the concretization of business ideas (development of business models), market potential estimation, resource planning, etc.) as well as the creation of an executable business plan (with or without VC financing).

The primary focus of the seminar is on working with the Business Model Canvas and developing a value proposition.

Learning objectives:

After attending, students have learned how to use a structured process to take the first steps in starting a business to identify and minimize their most important risks. In particular, they have practical experience in identifying and validating 1) relevant customer issues, 2) designing and testing solutions to these problems, 3) targeting and assessing their accessibility, and 4) their willingness to pay. In doing so, they have learned to know and apply the business model canvas, methods for developing value propositions, rapid prototyping and target group interviews. In addition, they have learned to work efficiently in a team through the use of communication strategies.

Credentials:

Registration is via the Wiwi portal.

Exam:

Presentation + active participation + paper.

Target group:

Bachelor students

V Seminar: Human Resources and Organizations (Bachelor)

2573010, 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: Human Resource Management (Bachelor)

2573011, 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 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 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

Data-Driven Investments

2530374, SS 2020, 2 SWS, Language: English, Open in study portal

Seminar (S)

Content
The digitalization is not only changing today’s society but also companies’ business models, in particular of the financial industry. In general, the large variety of digitalized processes and connected devices (Industry 4.0) generates a huge amount of data which can be used to extract valuable (investment) insights. For this task data science skills are essential.

In this seminar we will use modern data science techniques to analyze all kinds of financial and economic data, ranging from big data intra-day option prices to alternative datasets, like textual statements. For this empirical analysis we will use the state of the art Python programming language.

In a bi-weekly schedule you and your supervisor will first learn and discuss important data science concepts and then apply it in a practical FinTech-type analysis using real-world data. As a prerequisite students should already have basic finance knowledge.

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

Seminar Human Resources and Organizations (Bachelor)

2573010, 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 Seminar Human Resource Management (Bachelor)

2573011, 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 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 7.216 Course: Seminar in Economics (Bachelor) [T-WIWI-103487]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

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

Events					
WS 19/20	2521310	Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, Görgen
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	2560241	Digital IT Solutions and Services transforming the Field of Public Transportation	2 SWS	Prüfung (PR)	Janoshalmi
SS 2020	2560555	Fighting Climate Change, Seminar on Morals and Social Behavior (Master)	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	7900124	Seminar in Economics (Bachelor)		Prüfung (PR)	Szech, Puppe
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	7900205	Seminar in Macroeconomics I		Prüfung (PR)	Scheffel
WS 19/20	7900221	Topics in Experimental Economics		Prüfung (PR)	Reiß
WS 19/20	7900255	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	79sefi1	Seminar in Economics (Bachelor)		Prüfung (PR)	Wigger
SS 2020	7900036	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 Econometrics** **Seminar (S)**
2521310, WS 19/20, 2 SWS, Language: German, Open in study portal

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 **Fighting Climate Change, Seminar on Morals and Social Behavior (Master)** **Seminar (S)**
2560555, SS 2020, 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

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.

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 actively participation in the discussion.

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 7.217 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-101816 - 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 7.218 Course: Seminar in Informatics (Bachelor) [T-WIWI-103485]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Recurrence	Version
Examination of another type	3	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	2512311	Real-World Challenges in Data Science and Analytics	3 SWS		Sure-Vetter, Nickel, Weinhardt, Zehnder, Brandt
WS 19/20	2513200	Seminar Business Information Systems: Programming 3 (Bachelor)	2 SWS	Seminar (S)	Oberweis, Zöllner, Fritsch, Frister, Struppek
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	2513212	Seminar Business Information Systems: Artificial Intelligence and Robotic Process Automation (Bachelor)	2 SWS	Seminar (S)	Oberweis, Alpers, Goranov
SS 2020	2513308	Seminar Knowledge Discovery and Data Mining (Bachelor)	3 SWS	Seminar (S)	Sure-Vetter, Färber, Nguyen, Noullet , Saier
SS 2020	2513310	Seminar Data Science & Real-time Big Data Analytics (Bachelor)	2 SWS	Seminar (S)	Sure-Vetter, Riemer, Zehnder
SS 2020	2513402	Emerging Trends in Internet Technologies (Bachelor)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513404	Emerging Trends in Digital Health (Bachelor)	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2020	2513500	Cognitive Automobiles and Robots	2 SWS	Seminar (S)	Zöllner
SS 2020	2513554	Seminar Security, Usability and Society (Bachelor)	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	7900042	Seminar Betriebliche Informationssysteme: Programmieren 3		Prüfung (PR)	Oberweis
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	7900090	Seminar Data Science & Real-time Big Data Analytics (Bachelor)		Prüfung (PR)	Sure-Vetter
SS 2020	7900092	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter

SS 2020	7900094	Seminar Knowledge Discovery and Data Mining (Bachelor)	Prüfung (PR)	Sure-Vetter
SS 2020	7900136	Emerging Trends in Digital Health (Bachelor)	Prüfung (PR)	Sunyaev
SS 2020	7900187	Emerging Trends in Internet Technologies (Bachelor)	Prüfung (PR)	Sunyaev
SS 2020	7900194	Seminar Mathematics	Prüfung (PR)	Volkamer
SS 2020	7900197	Seminar Business Information Systems: Artificial Intelligence and Robotic Process Automation (Bachelor)	Prüfung (PR)	Oberweis
SS 2020	7900217	Seminar Security, Usability and Society (Bachelor)	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 **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 Seminar Business Information Systems: Programming 3 (Bachelor)
2513200, WS 19/20, 2 SWS, Open in study portal **Seminar (S)**

Content
Registration information and the content of the seminar will be announced on the course page. Only bachelor students are allowed to attend this seminar.

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 (Bachelor)

2513308, 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 (Bachelor)

2513310, 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 Security, Usability and Society (Bachelor)

2513554, 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:

Further explanations of the topics will be announced asap.

- Systematic literature review on security interventions in the context of address bar
- Systematic literature review on security seals in the context of online shops
- Systematic literature review on security seals in the context of IOT devices
- Security and privacy threat analysis of eScooters
- Systematic media-based review - Experts and media response to privacy issues related to the Corona outbreak. (english only)
- Systematic literature review of eye tracking studies in the context of security and privacy
- Do the SECUSO password awareness and education materials reflect the new “BSI Grundschutz”
- Systematic literature on security interventions in the context of phishing
- Systematic literature review on taxonomy of phishing attacks
- Key factors in “good” phishing emails
- Systematic literature review categorization of phishing paper

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 7.219 Course: Seminar in Mathematics (Bachelor) [T-MATH-102265]

Responsible: Dr. Martin Folkers
Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: M-WIWI-101816 - Seminar Module

Type	Credits	Version
Examination of another type	3	1

T 7.220 Course: Seminar in Operations Research (Bachelor) [T-WIWI-103488]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101816 - Seminar Module

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

Events					
WS 19/20	2550131	Seminar on Methodical Foundations of Operations Research	2 SWS	Seminar (S)	Stein
WS 19/20	2550472	Seminar on Power Systems Optimization (Bachelor)	2 SWS	Seminar (S)	Rebennack, Sinske
WS 19/20	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar (S)	Nickel, Mitarbeiter
SS 2020	2550472	Seminar on Power Systems Optimization (Bachelor)	2 SWS	Seminar (S)	Rebennack
SS 2020	2550491	Seminar: Modern OR and Innovative Logistics	2 SWS	Seminar (S)	Nickel, Mitarbeiter
Exams					
WS 19/20	7900011_WS1920	Seminar in Operations Research B (Bachelor)		Prüfung (PR)	Stein
WS 19/20	7900160	Modern OR and Innovative Logistics		Prüfung (PR)	Nickel
WS 19/20	7900216	Real-World Challenges in Data Science und Analytics		Prüfung (PR)	Nickel
WS 19/20	7900313	Seminar in Operations Research (Bachelor)		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 on Methodical Foundations of Operations Research

2550131, WS 19/20, 2 SWS, Language: German, Open in study portal

Seminar (S)

Content
The seminar aims at describing, evaluating, and discussing recent as well as classical topics in continuous optimization. The focus is on the treatment of optimization models and algorithms, also with respect to their practical application.

Bachelor studenst are introduced to the style of scientific work. By focussed treatment of a scientific topic they deal with the basics of scientific investigation and reasoning.

For further development of a scientific work style, master students are particularly expected to critically question the seminar topics.

With regard to the oral presentations the students become acquainted with presentation techniques and basics of scientifc reasoning. Also rethoric abilities may be improved.

Remarks:

Attendance at all oral presentations is compulsory.

Preferably at least one module offered by the Institute of Operations Research should have been chosen before attending this seminar.

Assessment:

The assessment is composed of a 15-20 page paper as well as a 40-60 minute oral presentation according to §4(2), 3 of the examination regulation.The grade is composed of the equally weighted assessments of the paper and the oral presentation.

The seminar is appropriate for bachelor as well as for master students. Their differentiation results from different assessment criteria for the seminar paper and the oral presentation.

Workload:

The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Die Literaur und die relevanten Quellen werden gegen Ende des vorausgehenden Semesters im Wiwi-Portal und in einer Seminarvorbesprechung bekannt gegeben.

References and relevant sources are announced at the end of the preceding semester in the Wiwi-Portal and in a prepatory meeting.

V Seminar: Modern OR and Innovative Logistics

2550491, WS 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 7.221 Course: Seminar in Statistics (Bachelor) [T-WIWI-103489]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101816 - Seminar Module

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

Events					
WS 19/20	2521310	Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, 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 Topics in Econometrics

2521310, WS 19/20, 2 SWS, Language: German, Open in study portal **Seminar (S)**

T 7.222 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-101816 - 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
SS 2020	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 7.223 Course: Seminar: Legal Studies I [T-INFO-101997]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-WIWI-101816 - 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
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

2400061, SS 2020, 2 SWS, Open in study portal **Seminar (S)**

Content
Registration via https://portal.wiwi.kit.edu/ys/2708

V Online Manipulative Practices: New Technologies and Fundamental Rights Infringements

2400153, SS 2020, 2 SWS, Open in study portal **Seminar (S)**

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 7.224 Course: Services Marketing and B2B Marketing [T-WIWI-102806]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2572158	Services Marketing and B2B Marketing	2 SWS	Lecture (V)	Klarmann
Exams					
WS 19/20	7900081	Services Marketing and B2B Marketing		Prüfung (PR)	Klarmann
WS 19/20	7900126	Services Marketing and B2B Marketing		Prüfung (PR)	Klarmann

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 **Services Marketing and B2B Marketing** **Lecture (V)**
2572158, WS 19/20, 2 SWS, Language: German, Open in study portal

Content
The aim of this course is to prepare students for two certain marketing perspectives. The service marketing is concentrated on the particularities coming up when a company sells services instead of products. Subjects in this section are for example:

- Measuring service quality
- Pricing services
- Management of service staff

The second part of the course contains a business-to-business marketing perspective. Topics are below others:

- Management of buying centers
- Competitive Bidding
- B2B-Branding

Students

- know about the characteristics of service- and B2B environments
- are able to apply different methods (SERVQUAL, Gap-model, Mystery Shopping) to measure the quality of services
- are able to design pricing systems for services
- know about queuing management
- are able to plan capacities in service environments
- are able to identify different types of B2B businesses and know about their characteristics
- know about the specifics and challenges of B2B branding
- know central theories about organizational buying
- are able to apply the concept of competitive bidding for tenders
- are able to prepare, conduct, and review price negotiations

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 90 hours.

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

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

T 7.225 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 , Daiß
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 7.226 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 7.227 Course: Social Science A (WiWi) [T-GEISTSOZ-109048]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

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

Events					
WS 19/20	5011011	Economic inequality	2 SWS	Seminar (S)	Binder
WS 19/20	5011014	Sociology of Technology	SWS	Seminar (S)	Lösch
SS 2020	5011003	Social Change and Social Policy	2 SWS	Seminar (S)	Binder
SS 2020	5011008	Sociology of Organizations	2 SWS	Seminar (S)	Kauppert
SS 2020	5011013	Economic Inequality	2 SWS	Seminar (S)	Binder
SS 2020	5011019	Sociology of Organizations	2 SWS	Seminar (S)	Kauppert
Exams					
WS 19/20	7400041	Social Science A (WiWi)		Prüfung (PR)	Nollmann

T 7.228 Course: Social Science B (WiWi) [T-GEISTSOZ-109049]

Responsible: Prof. Dr. Gerd Nollmann
Organisation: KIT Department of Humanities and Social Sciences
Part of: M-GEISTSOZ-101167 - Sociology/Empirical Social Research

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

Events					
WS 19/20	5011011	Economic inequality	2 SWS	Seminar (S)	Binder
WS 19/20	5011014	Sociology of Technology	SWS	Seminar (S)	Lösch
Exams					
WS 19/20	7400046	Social Science B (WiWi)		Prüfung (PR)	Nollmann

T 7.229 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-101434 - eBusiness and Service Management

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
SS 2020	7900224	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 7.230 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-101599 - Statistics and Econometrics

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 7.231 Course: Statistics I [T-WIWI-102737]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101432 - Introduction to Statistics

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2020	2600008	Statistics I	4 SWS	Lecture (V)	Grothe
Exams					
WS 19/20	7900009	Statistics I		Prüfung (PR)	Schienle

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

The exam takes place at the end of the lecture period or at the beginning of the recess period. The re-examination takes place in the following semester.

Prerequisites
None

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

V Statistics I

2600008, SS 2020, 4 SWS, Language: German, Open in study portal

Lecture (V)

Content

Learning objectives:

The Student understands and applies

- the basic concepts of statistical data exploration,
- the basic definitions and theorems of probability theory.

Content:

A. Descriptive Statistics: univariate und bivariate analysis

B. Probability Theory: probability space, conditional and product probabilities

C. Random variables: location and shape parameters, dependency measures, concrete distribution models

Workload:

Total workload for 5 CP: approx. 150 hours

Attendance: 60 hours

Preparation and follow-up: 90 hours

Literature
Skriptum: Kurzfassung Statistik I

Weiterführende Literatur:

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

T 7.232 Course: Statistics II [T-WIWI-102738]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101432 - Introduction to Statistics

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	1

Events					
WS 19/20	2610020	Statistics II	4 SWS	Lecture (V)	Schienle
WS 19/20	2610021		2 SWS	Tutorial (Tu)	Schienle, Rüter, Zerwas
WS 19/20	2610022	PC-Praktikum zu Statistik II	2 SWS		Schienle, Görgen
Exams					
WS 19/20	7900282	Statistics II		Prüfung (PR)	Schienle
SS 2020	7900737	Statistics II		Prüfung (PR)	Schienle

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

The exam takes place at the end of the lecture period or at the beginning of the recess period. The re-examination takes place in the following semester.

Prerequisites
None

Recommendation
It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2610020].

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

V Statistics II

2610020, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

Content
Learning objectives:

The student

- understands and applies the basic definitions and theorems of probability theory,
- transfers these theoretical foundations to problems in parametrical mathematical statistics.

Content:

D. Sampling and Estimation Theory: Sampling distributions, estimators, point and interval estimation
E. Test Theory: General Principles of Hypothesis Testing, Concrete 1- and 2-Sampling Tests
F. Regression analysis: Simple and multiple linear regression, statistical inference

Requirements:

It ist recommended to attend the course *Statistics I* [2600008] before the course *Statistics II* [2600020].

Workload:

Total workload: 150 hours (5.0 Credits).

Attendance: 30 hours

Preparation and follow-up: 90 hours

Literature
Skriptum: Kurzfassung Statistik II

Weiterführende Literatur:

Bamberg, G., Baur, F. und Krapp, M.: Statistik, 15. überarb. Auflage. Oldenbourg, München 2009, ISBN 978-3486590883.

Fahrmeir, L., Heumann, C., Künstler, R., Pigeot, I. und Tutz, G.: Statistik - Der Weg zur Datenanalyse, 8. Auflage. Springer Spektrum. Berlin 2016, ISBN 978-3-662-50371-3.

Mosler, K. und Schmid, F.: Beschreibende Statistik und Wirtschaftsstatistik, 4. akt. und verb. Auflage, Springer, Berlin 2009, ISBN 978-3642015564.

Mosler, K. und Schmid, F.: Wahrscheinlichkeitsrechnung und schließende Statistik, 4. verb. Aufl., Springer, Berlin 2011, ISBN 978-3642150098.

Stock, J.H. und Watson M.W.: Introduction to Econometrics, 3. Auflage, Prentice Hall 2014, ISBN 978-1292071312

Stocker, T.C. und Steinke I.: Statistik: Grundlagen und Methodik. De Gruyter Oldenbourg, Berlin 2016 ISBN-13: 978-3110353884.

T 7.233 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-101423 - Topics in Finance II
M-WIWI-101465 - Topics in Finance I

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 7.234 Course: Structural and Phase Analysis [T-MACH-102170]

Responsible: Dr.-Ing. Susanne Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101262 - Emphasis 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 7.235 Course: Structural Ceramics [T-MACH-102179]

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

Part of: M-MACH-101262 - Emphasis 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 Enginewering (2003)

T 7.236 Course: Supplement Applied Informatics [T-WIWI-110711]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101426 - Electives in Informatics

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

Competence Certificate
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Depending on the particular course associated with this placeholder a bonus on the examination grade is possible.

Prerequisites
None

Annotation
This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but is not equivalent to another course of this topic.

T 7.237 Course: System Dynamics and Control Engineering [T-ETIT-101921]

Responsible: Prof. Dr.-Ing. Sören Hohmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-101156 - Control Engineering

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	2

Exams				
WS 19/20	7303155	System Dynamics and Control Engineering	Prüfung (PR)	Hohmann

Prerequisites
none

T 7.238 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-101262 - Emphasis 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
SS 2020	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
The two courses "Materials Science I" (T-MACH-102078) and "Materials Science II" (T-MACH-102079) must be passed.

Recommendation
Basic knowledge in materials science, mechanics and mechanical design due to the lecture Materials Science I/II.

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

V Systematic Materials Selection

Lecture (V)

2174576, SS 2020, 3 SWS, Language: German, Open in study portal

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 7.239 Course: Systems of Remote Sensing, Prerequisite [T-BGU-101637]

Responsible: Prof. Dr.-Ing. Stefan Hinz
Dr.-Ing. Uwe Weidner

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: M-WIWI-104838 - Introduction to Natural Hazards and Risk Analysis

Type	Credits	Recurrence	Version
Completed coursework	1	Each summer term	1

Events					
SS 2020	6020242	Fernerkundungssysteme, Übung	1 SWS	Practice (Ü)	Weidner
Exams					
SS 2020	8284101637	Systems of Remote Sensing, Prerequisite		Prüfung (PR)	Weidner

Prerequisites
None

Recommendation
None

Annotation
None

T 7.240 Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Applications of Operations Research
M-WIWI-101421 - Supply Chain Management
M-WIWI-103278 - Optimization under Uncertainty

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	3

Events					
SS 2020	2550486	Taktisches und operatives SCM	2 SWS	Lecture (V)	Nickel
SS 2020	2550487	Übungen zu Taktisches und operatives SCM	1 SWS	Practice (Ü)	Dunke
Exams					
WS 19/20	00012	Tactical and Operational Supply Chain Management		Prüfung (PR)	Nickel
SS 2020	7900226	Tactical and Operational Supply Chain Management		Prüfung (PR)	Nickel

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.

Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in 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 Taktisches und operatives SCM

2550486, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The planning of material transport is an essential element of Supply Chain Management. By linking transport connections across different facilities, the material source (production plant) is connected with the material sink (customer). The general supply task can be formulated as follows (cf. Gudehus): For given material flows or shipments, 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. The main goal of the inventory management is the optimal determination of order quantities in terms of minimization of fixed and variable costs subject to resource constraints, supply availability and service level requirements. Similarly, the problem of lot sizing in production considers the determination of the optimal amount of products to be produced in a time slot. The course includes an introduction to basic terms and definitions of Supply Chain Management and a presentation of fundamental quantitative planning models for distribution, vehicle routing, inventory management and lot sizing. Furthermore, case
studies from practice will be discussed in detail.

Literature
Weiterführende Literatur

- Domschke: Logistik: Transporte, 5. Auflage, Oldenbourg, 2005
- Domschke: Logistik: Rundreisen und Touren, 4. Auflage, Oldenbourg, 1997
- Ghiani, Laporte, Musmanno: Introduction to Logistics Systems Planning and Control, Wiley, 2004
- Gudehus: Logistik, 3. Auflage, Springer, 2005
- Simchi-Levi, Kaminsky, Simchi-Levi: Designing and Managing the Supply Chain, 3rd edition, McGraw-Hill, 2008
- Silver, Pyke, Peterson: Inventory management and production planning and scheduling, 3rd edition, Wiley, 1998

T 7.241 Course: Technical Conditions Met [T-WIWI-106623]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics

Type	Credits	Recurrence	Version
Completed coursework	0	Each term	1

Competence Certificate
This module element is intended to record the Bachelor-examination "Introduction to Game Theory". In the master module M-WIWI-101453 "Applied Strategic Decisions", this means that the obligatory course "Advanced Game Theory" is not required.

Prerequisites
None

T 7.242 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
SS 2020	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 7.243 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
SS 2020	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 7.244 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
SS 2020	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 7.245 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 7.246 Course: Virtual Reality Practical Course [T-MACH-102149]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101270 - Product Lifecycle Management

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

Events					
WS 19/20	2123375	Virtual Reality Practical Course	3 SWS	Project (PRO)	Ovtcharova, Mitarbeiter
Exams					
WS 19/20	76-T-MACH-102149	Virtual Reality Practical Course		Prüfung (PR)	Ovtcharova

Competence Certificate
Assessment of another type (graded)

Prerequisites
None

Annotation
Number of participants is limited

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

V Virtual Reality Practical Course

2123375, WS 19/20, 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 7.247 Course: Welfare Economics [T-WIWI-102610]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101501 - Economic Theory

Type	Credits	Recurrence	Version
Written examination	4,5	Each summer term	2

Competence Certificate
The assessment consists of a written exam at the end of the semester (according to Section 4 (2), 1 or 2 of the examination regulation).

Prerequisites
The courses *Economics I: Microeconomics* [2610012] and *Economics II: Macroeconomics* [2600014] have to be completed beforehand.

Recommendation
None