Module Handbook
Industrial Engineering and Management M.Sc.

SPO 2015
Summer term 2019
Date: 04.03.2019
Welcome to the new module handbook of your study programme

Field of study structure

The Master's degree program in Industrial Engineering and Management

Notes and rules

Types of exams

Additional accomplishments

Module versions

Economics

Engineering Sciences

Business & Service Engineering - M-WIWI-101410

BioMEMS - M-MACH-101290

Data Science: Data-Driven Information Systems - M-WIWI-103117

Designing Interactive Information Systems - M-WIWI-104080

Energy and Process Technology I - M-MACH-101296

Cross-Functional Management Accounting - M-WIWI-101510

Data Science: Advanced CRM - M-WIWI-101470

Data Science: Data-Driven Information Systems - M-WIWI-103117

Data Science: Data-Driven User Modeling - M-WIWI-103118

Data Science: Evidence-based Marketing - M-WIWI-101647

Design, Construction, Operation and Maintenance of Highways - M-BGU-100998

Designing Interactive Information Systems - M-WIWI-104080

Digital Service Systems in Industry - M-WIWI-102808

Disruptive FinTech Innovations - M-WIWI-103261

Econometrics and Statistics I - M-WIWI-101638

Econometrics and Statistics II - M-WIWI-101639

Economic Theory and its Application in Finance - M-WIWI-101502

eEnergy: Markets, Services and Systems - M-WIWI-103720

Electives in Informatics - M-WIWI-101630

Electronic Markets - M-WIWI-101409

Emphasis in Informatics - M-WIWI-101628

Energy and Process Technology I - M-MACH-101296
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1 Welcome to the new module handbook of your study programme

We are delighted that you have decided to study at the KIT Department of Economics and Management and wish you a good start into the new semester!

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

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Write to us!
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 examination. 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 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.

2.1.7 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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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

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/ruenderschmiede/fuer-studierende/](http://kit-gruenderschmiede.de/de/ruenderschmiede/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/](http://www.sport.kit.edu/hochschulsport/)) External Link. Campus University. The KIT has a large campus directly in the city centre of Karlsruhe.
4 The Master's degree program in Industrial Engineering and Management

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

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

They have generalized or specialized expertise in the different disciplines.

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

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

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

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

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

They are able to come up with innovative ideas and apply them accordingly.

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

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

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

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

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

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

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

**Soft skills**

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

**Enabling skills**

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

**Orientational knowledge**

- Acquisition of interdisciplinary knowledge
- Institutional knowledge about economic and legal systems
- Knowledge about international organisations
- Media, technology and innovation
The integrative acquisition of key skills especially takes place in several obligatory courses during the master programme, namely

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

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

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Master Thesis</td>
<td>30 CR</td>
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<tr>
<td>Business Administration</td>
<td>18 CR</td>
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<tr>
<td>Economics</td>
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<tr>
<td>Informatics</td>
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<tr>
<td>Operations Research</td>
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<td>Engineering Sciences</td>
<td>18 CR</td>
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<tr>
<td>Compulsory Elective Modules</td>
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### 5.1 Master Thesis

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### 5.2 Business Administration

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<td>M-WIWI-101410</td>
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<tr>
<td>M-WIWI-101498</td>
<td>Management Accounting</td>
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<tr>
<td>M-WIWI-101510</td>
<td>Cross-Functional Management Accounting</td>
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<tr>
<td>M-WIWI-101470</td>
<td>Data Science: Advanced CRM</td>
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<tr>
<td>M-WIWI-103117</td>
<td>Data Science: Data-Driven Information Systems</td>
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<td>M-WIWI-103118</td>
<td>Data Science: Data-Driven User Modeling</td>
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<td>M-WIWI-101647</td>
<td>Data Science: Evidence-based Marketing</td>
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<td>M-WIWI-104080</td>
<td>Designing Interactive Information Systems</td>
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<td>M-WIWI-103261</td>
<td>Disruptive FinTech Innovations</td>
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<td>M-WIWI-103720</td>
<td>eEnergy: Markets, Services and Systems</td>
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<td>M-WIWI-101409</td>
<td>Electronic Markets</td>
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<td>M-WIWI-101452</td>
<td>Energy Economics and Technology</td>
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<td>Real Estate Economics and Sustainability</td>
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<td>M-WIWI-101449</td>
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<td>M-WIWI-103247</td>
<td>Intelligent Risk and Investment Advisory</td>
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<td>M-WIWI-101446</td>
<td>Market Engineering</td>
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<td>M-WIWI-101490</td>
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<td>M-WIWI-101506</td>
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<td>Service Design Thinking</td>
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<td>M-WIWI-102754</td>
<td>Service Economics and Management</td>
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<td>M-WIWI-102806</td>
<td>Service Innovation, Design &amp; Engineering</td>
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<td>M-WIWI-101448</td>
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<td>M-WIWI-103119</td>
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### 5.3 Economics

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<td>Agglomeration and Innovation</td>
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<td>M-WIWI-101453</td>
<td>Applied Strategic Decisions</td>
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<td>M-WIWI-101504</td>
<td>Collective Decision Making</td>
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<td>M-WIWI-101505</td>
<td>Experimental Economics</td>
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<td>M-WIWI-101514</td>
<td>Innovation Economics</td>
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<td>M-WIWI-101478</td>
<td>Innovation and Growth</td>
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<td>M-WIWI-101500</td>
<td>Microeconomic Theory</td>
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<td>Network Economics</td>
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<td>M-WIWI-101502</td>
<td>Economic Theory and its Application in Finance</td>
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<td>Environmental Economics</td>
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<td>Advanced Topics in Public Finance</td>
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<td>Transport Infrastructure Policy and Regional Development</td>
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<td>M-WIWI-101496</td>
<td>Growth and Agglomeration</td>
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### 5.4 Informatics

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### 5.5 Operations Research

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<td>M-WIWI-102832</td>
<td>Operations Research in Supply Chain Management</td>
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<td>M-WIWI-102805</td>
<td>Service Operations</td>
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<tr>
<td>M-WIWI-103289</td>
<td>Stochastic Optimization</td>
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## 5.6 Engineering Sciences

**Election block: Ingenieurwissenschaften (2 items)**

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<td>M-MACH-101290</td>
<td>BioMEMS</td>
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<td>Introduction to Logistics</td>
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<td>M-MACH-101296</td>
<td>Energy and Process Technology I</td>
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<td>M-MACH-101297</td>
<td>Energy and Process Technology II</td>
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<td>M-BGU-100998</td>
<td>Design, Construction, Operation and Maintenance of Highways</td>
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<td>M-ETIT-101164</td>
<td>Generation and transmission of renewable power</td>
<td>9 CR</td>
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<td>M-MACH-101264</td>
<td>Handling Characteristics of Motor Vehicles</td>
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<td>Vehicle Development</td>
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<td>Manufacturing Technology</td>
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<td>Global Production and Logistics</td>
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5.7 Compulsory Elective Modules

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

### Mandatory

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**Election block: Betriebswirtschaftslehre (at most 18 credits)**

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<td>Data Science: Data-Driven User Modeling</td>
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**Election block: Volkswirtschaftslehre (at most 18 credits)**
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**Election block: Informatik (at most 18 credits)**

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<td>M-WIWI-101630</td>
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**Election block: Operations Research (at most 18 credits)**

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**Election block: Ingenieurwissenschaften (at most 18 credits)**

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<tr>
<td>M-GEISTSOZ-101169</td>
<td>Sociology</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-INFO-101191</td>
<td>Commercial Law</td>
<td>9 CR</td>
</tr>
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</table>
6 Modules

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

**Responsible:** Prof. Dr. Berthold Wigger

**Organisation:** KIT Department of Economics and Management

**Part of:** Economics

**Compulsory Elective Modules (Volkswirtschaftslehre)**

**Credits** 9

<table>
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<th>Recurrence</th>
<th>Duration</th>
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<th>Version</th>
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**Credits** 4,5

**Recurrence** Each term

**Duration** 2 semester

**Level** 4

**Version** 3

**Mandatory**

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<th>Lecturer</th>
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<tr>
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<td>Public Management</td>
<td>4,5 CR</td>
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**Election block: Ergänzungsangebot (between 4,5 and 5 credits)**

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<tr>
<td>T-WIWI-108880</td>
<td>Blockchains &amp; Cryptofinance</td>
<td>4,5 CR</td>
<td>Schuster, Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-108711</td>
<td>Basics of German Company Tax Law and Tax Planning</td>
<td>4,5 CR</td>
<td>Gutekunst, Wigger</td>
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<tr>
<td>T-WIWI-102739</td>
<td>Public Revenues</td>
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**Comprehensive Certificate**

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

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

**Competence Goal**

The student:

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

**Prerequisites**

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

**Content**

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

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

**Recommendation**

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

**Annotation**

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

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

Industrial Engineering and Management M.Sc.
Module Handbook as of 04.03.2019
**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
### 6.2 Module: Advanced Topics in Strategy and Management [M-WIWI-103119]

**Responsible:** Prof. Dr. Hagen Lindstädt  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Business Administration (Usage from 10/1/2017)  
Compulsory Elective Modules (Betriebswirtschaftslehre) (Usage from 10/1/2017)

<table>
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**Election block: Wahlpflichtangebot (9 credits)**

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<tbody>
<tr>
<td>T-WIWI-106188</td>
<td>Workshop Current Topics in Strategy and Management</td>
<td>3 CR</td>
<td>Lindstädt</td>
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<tr>
<td>T-WIWI-106189</td>
<td>Workshop Business Wargaming – Analyzing Strategic Interactions</td>
<td>3 CR</td>
<td>Lindstädt</td>
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<tr>
<td>T-WIWI-106190</td>
<td>Strategy and Management Theory: Developments and “Classics”</td>
<td>3 CR</td>
<td>Lindstädt</td>
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</table>

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

**Competence Goal**

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

**Prerequisites**
None

**Content**
The module is divided into three main topics:
The students
- analyze and discuss a wide range of business strategies on the basis of collectively selected case studies.
- participate in a business wargaming workshop and analyze strategic interactions.
- write a paper about current topics in the field of strategic management theory.

**Recommendation**
None

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

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

This module will be offered for the first time in the winter term 2017/18.
6.3 Module: Agglomeration and Innovation [M-WIWI-101497]

**Responsible:** Prof. Dr. Ingrid Ott

**Organisation:** KIT Department of Economics and Management

**Part of:** Economics
Compulsory Elective Modules (Volkswirtschaftslehre)

<table>
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**Election block: Wahlpflichtangebot (9 credits)**

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<tr>
<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory</td>
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<td>T-WIWI-109194</td>
<td>Dynamic Macroeconomics</td>
<td>4,5</td>
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<td>Brumm</td>
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<td>Innovationtheory and -Policy</td>
<td>4,5</td>
<td>CR</td>
<td>Ott</td>
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<tr>
<td>T-WIWI-103107</td>
<td>Spatial Economics</td>
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**Competence Certificate**
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must add up to at least 9.

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

**Competence Goal**
The student

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

**Prerequisites**
None

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

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Analytics and Statistics [M-WIWI-101637]

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

<table>
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Mandatory

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<tbody>
<tr>
<td>T-WIWI-103123</td>
<td>Advanced Statistics</td>
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<td>Grothe</td>
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Election block: Ergänzungsangebot (between 4,5 and 5 credits)

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<th>Credits</th>
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<tbody>
<tr>
<td>T-WIWI-106341</td>
<td>Machine Learning 2 – Advanced Methods</td>
<td>5</td>
<td>Zöllner</td>
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<tr>
<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</td>
<td>4,5</td>
<td>Grothe</td>
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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 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
A Student
- Deepens the knowledge of descriptive and inferential statistics.
- Deals with simulation methods.
- Learns basic and advanced methods of statistical analysis of multivariate and high-dimensional data.

Prerequisites
The course “Advanced Statistics” is compulsory.

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

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

Workload
The total workload for this module is approximately 270 hours.
Module: Applied Strategic Decisions [M-WIWI-101453]

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

Election block: Ergänzungsangebot (between 1 and 2 items as well as at least 4,5 credits)

<table>
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<tr>
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<td>Auction Theory</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-102614</td>
<td>Experimental Economics</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-102622</td>
<td>Corporate Financial Policy</td>
<td>4,5 CR</td>
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<td>T-WIWI-102623</td>
<td>Financial Intermediation</td>
<td>4,5 CR</td>
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<td>T-WIWI-102640</td>
<td>Market Engineering: Information in Institutions</td>
<td>4,5 CR</td>
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<td>4,5 CR</td>
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Election block: Wahlpflichtangebot (1 item)

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<tr>
<td>T-WIWI-102861</td>
<td>Advanced Game Theory</td>
<td>4,5 CR</td>
<td>Ehrhart, Puppe, Reiß</td>
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<td>Technical Conditions Met</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal
Students

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

Prerequisites
The course Advanced Game Theory is obligatory. Exception: The course Introduction to Game Theory [2520525] was completed.

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

Recommendation
Basic knowledge in game theory is assumed.

Annotation
The course Predictive Mechanism and Market Design is not offered each year.
The course "Decision Theory" [2520365] will not be offered any more from summer term 2015 on. The examination will be offered latest until winter term 2015/2016 (repeaters only).

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
6.6 Module: Automated Manufacturing Systems [M-MACH-101298]

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

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

<table>
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**Mandatory**

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<tr>
<td>T-MACH-102162</td>
<td>Automated Manufacturing Systems</td>
<td>9 CR</td>
<td>Fleischer</td>
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</table>

**Competence Certificate**

written exam (120 minutes)

**Competence Goal**

The students:

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

**Prerequisites**

none

**Content**

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

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

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

**Workload**

regular attendance: 63 hours  
self-study: 207 hours
Learning type
Lectures, exercise, excursion
6.7 Module: Automotive Engineering [M-MACH-101266]

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

Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

<table>
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Election block: Fahrzeugtechnik (at least 9 credits)

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<td>T-MACH-100092</td>
<td>Automotive Engineering I</td>
<td>6 CR</td>
<td>Gauterin, Unrau</td>
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<tr>
<td>T-MACH-102117</td>
<td>Automotive Engineering II</td>
<td>3 CR</td>
<td>Gauterin, Unrau</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering</td>
<td>4,5 CR</td>
<td>Frey, Gauterin, Gießler</td>
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<tr>
<td>T-MACH-102116</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies I</td>
<td>1,5 CR</td>
<td>Bardehle</td>
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<tr>
<td>T-MACH-102119</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies II</td>
<td>1,5 CR</td>
<td>Bardehle</td>
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<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems</td>
<td>5 CR</td>
<td>Geimer, Pult</td>
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<td>T-MACH-102150</td>
<td>BUS-Controls</td>
<td>3 CR</td>
<td>Becker, Geimer</td>
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<td>T-MACH-108889</td>
<td>BUS-Controls - Advance</td>
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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 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 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

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.
6.8 Module: BioMEMS [M-MACH-101290]

**Responsible:** Prof. Dr. Jan Gerrit Korvink

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences

**Credits:** 9
**Language:** Deutsch
**Level:** 4
**Version:** 2

### Mandatory

<table>
<thead>
<tr>
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<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I</td>
<td>3 CR</td>
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### Election block: BioMEMS (at least 6 credits)

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<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology</td>
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<td>T-MACH-102165</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers</td>
<td>3 CR</td>
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<td>T-MACH-101910</td>
<td>Microactuators</td>
<td>3 CR</td>
<td>Kohl</td>
<td></td>
</tr>
<tr>
<td>T-MACH-102172</td>
<td>Bionics for Engineers and Natural Scientists</td>
<td>3 CR</td>
<td>Hölscher</td>
<td></td>
</tr>
<tr>
<td>T-MACH-102176</td>
<td>Current Topics on BioMEMS</td>
<td>4 CR</td>
<td>Guber</td>
<td></td>
</tr>
</tbody>
</table>

### Competence Certificate

The assessment is carried out as partial exams

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

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

### Competence Goal

The student

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

### Prerequisites

none
Content
Operations through small orifices, a pill which will take pictures on its way through your body or lab results right at the point of care - the need for easier and faster ways to help people is an important factor in research. The module BioMEMS (Bio(medical)-Micro-Electro-Mechanical-Systems) describes the application of microtechnology in the field of Life-Science, medical applications and Biotechnology and will teach you the necessary skills to understand and develop biological and medical devices.

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

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

Workload
270 hours
Module: Business & Service Engineering [M-WIWI-101410]

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

Election block: Wahlpflichtangebot (9 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
<td>4.5 CR</td>
<td>5</td>
<td>Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-102639</td>
<td>Business Models in the Internet: Planning and Implementation</td>
<td>4.5 CR</td>
<td>5</td>
<td>Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-102848</td>
<td>Personalization and Services</td>
<td>4.5 CR</td>
<td>5</td>
<td>Sonnenbichler</td>
</tr>
<tr>
<td>T-WIWI-102847</td>
<td>Recommender Systems</td>
<td>4.5 CR</td>
<td>5</td>
<td>Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102799</td>
<td>Practical Seminar Service Innovation</td>
<td>4.5 CR</td>
<td>5</td>
<td>Satzger</td>
</tr>
<tr>
<td>T-WIWI-102641</td>
<td>Service Innovation</td>
<td>4.5 CR</td>
<td>5</td>
<td>Satzger</td>
</tr>
<tr>
<td>T-WIWI-109940</td>
<td>Special Topics in Information Systems</td>
<td>4.5 CR</td>
<td>5</td>
<td>Weinhardt</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal
The student should

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

Prerequisites
None

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

Recommendation
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
6.10 Module: Collective Decision Making [M-WIWI-101504]

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

<table>
<thead>
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<th>Credits</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
<th>Version</th>
</tr>
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<tbody>
<tr>
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**Election block: Wahlpflichtangebot ()**

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<tr>
<td>T-WIWI-102740</td>
<td>Public Management</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-102859</td>
<td>Social Choice Theory</td>
<td>4,5 CR</td>
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**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 separately.
The overall grade of the the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**
Students

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

**Prerequisites**
None

**Content**
The focus of the module is on mechanisms of public decisions making, including voting and the aggregation of preferences and judgements.

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
6.11 Module: Combustion Engines I [M-MACH-101275]

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

**Organisation:** KIT Department of Mechanical Engineering

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

<table>
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<tr>
<td>9</td>
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<td>1 semester</td>
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**Mandatory**

<table>
<thead>
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<th>Code</th>
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<tbody>
<tr>
<td>T-MACH-102194</td>
<td>Combustion Engines I</td>
<td>5 CR</td>
<td>Koch, Kubach</td>
</tr>
<tr>
<td>T-MACH-105564</td>
<td>Energy Conversion and Increased Efficiency in Internal Combustion Engines</td>
<td>4 CR</td>
<td>Koch, Kubach</td>
</tr>
</tbody>
</table>

**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 principle 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  
Combustion in Gasoline and Diesel engines  
Heat release calculation  
Waste heat recovery

**Workload**  
regular attendance: 62 hours  
self-study: 208 hours
Module: Combustion Engines II [M-MACH-101303]

M 6.12 Module: Combustion Engines II [M-MACH-101303]

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

Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

Mandatory

<table>
<thead>
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<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>T-MACH-104609</td>
<td>Combustion Engines II</td>
<td>9 CR</td>
<td>Each term</td>
<td>4</td>
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Election block: Verbrennungsmotoren II (at least 4 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecturers</th>
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</thead>
<tbody>
<tr>
<td>T-MACH-105044</td>
<td>Fundamentals of Catalytic Exhaust Gas Aftertreatment</td>
<td>4 CR</td>
<td>Deutschmann, Grunwaldt, Kubach, Lox</td>
</tr>
<tr>
<td>T-MACH-105173</td>
<td>Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines</td>
<td>4 CR</td>
<td>Gohl</td>
</tr>
<tr>
<td>T-MACH-105184</td>
<td>Fuels and Lubricants for Combustion Engines</td>
<td>4 CR</td>
<td>Kehrwald, Kubach</td>
</tr>
<tr>
<td>T-MACH-105167</td>
<td>Analysis Tools for Combustion Diagnostics</td>
<td>4 CR</td>
<td>Pfeil</td>
</tr>
<tr>
<td>T-MACH-102197</td>
<td>Gas Engines</td>
<td>4 CR</td>
<td>Golloch</td>
</tr>
<tr>
<td>T-MACH-102199</td>
<td>Model Based Application Methods</td>
<td>4 CR</td>
<td>Kirschbaum</td>
</tr>
<tr>
<td>T-MACH-105169</td>
<td>Engine Measurement Techniques</td>
<td>4 CR</td>
<td>Bernhardt</td>
</tr>
</tbody>
</table>

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

Competence Goal
See courses.

Prerequisites
None

Modelled conditions
The following conditions have to be fulfilled:

1. The module M-MACH-101275 - Combustion Engines I must have been started.

Content

Compulsory:
- Supercharging and air management
- Engine maps
- Emissions and Exhaust gas aftertreatment
- Transient engine operation
- ECU 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

Industrial Engineering and Management M.Sc.
Module Handbook as of 04.03.2019
Workload
regular attendance: 62 h
self-study: 208 h
## 6.13 Module: Commercial Law [M-INFO-101191]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** Compulsory Elective Modules (Recht oder Soziologie)

<table>
<thead>
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<th>Credits</th>
<th>Recurrence</th>
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<th>Language</th>
<th>Level</th>
<th>Version</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>2 semester</td>
<td>Deutsch</td>
<td>4</td>
<td>1</td>
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### Mandatory

<table>
<thead>
<tr>
<th>T-INFO-102013</th>
<th>Exercises in Civil Law</th>
<th>9 CR</th>
<th>Dreier, Matz</th>
</tr>
</thead>
</table>
## 6.14 Module: Control Engineering II [M-ETIT-101157]

**Responsible:** Prof. Dr.-Ing. Sören Hohmann  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** Engineering Sciences  
Compulsory Elective Modules (Ingenieurwissenschaften)

<table>
<thead>
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<th>Credits</th>
<th>Level</th>
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<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>4</td>
<td>1</td>
<td>T-ETIT-100981 Automation of Discrete Event and Hybrid Systems</td>
<td>3 CR</td>
<td>Hohmann</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>T-ETIT-100666 Control of Linear Multivariable Systems</td>
<td>6 CR</td>
<td>Hohmann</td>
<td></td>
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</table>
Module: Cross-Functional Management Accounting [M-WIWI-101510]

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

<table>
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<tr>
<th>Credits</th>
<th>Language</th>
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<th>Version</th>
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<tbody>
<tr>
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Mandatory

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<th>Course Name</th>
<th>Credits</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>T-WIWI-102885</td>
<td>Advanced Management Accounting</td>
<td>4,5 CR</td>
<td>Wouters</td>
</tr>
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</table>

Election block: Ergänzungsangebot (4,5 credits)

<table>
<thead>
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<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-105777</td>
<td>Business Intelligence Systems</td>
<td>4,5 CR</td>
<td>Mädche, Nadj, Toreini</td>
</tr>
<tr>
<td>T-WIWI-105781</td>
<td>Incentives in Organizations</td>
<td>4,5 CR</td>
<td>Nieken</td>
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<tr>
<td>T-WIWI-102835</td>
<td>Marketing Strategy Business Game</td>
<td>1,5 CR</td>
<td>Klarmann</td>
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<tr>
<td>T-WIWI-107720</td>
<td>Market Research</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-102803</td>
<td>Modeling Strategic Decision Making</td>
<td>4,5 CR</td>
<td>Lindstädt</td>
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<tr>
<td>T-WIWI-102883</td>
<td>Pricing</td>
<td>4,5 CR</td>
<td>Feurer</td>
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<tr>
<td>T-WIWI-109864</td>
<td>Product and Innovation Management</td>
<td>3 CR</td>
<td>Klarmann</td>
</tr>
<tr>
<td>T-WIWI-102621</td>
<td>Valuation</td>
<td>4,5 CR</td>
<td>Ruckes</td>
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<tr>
<td>T-WIWI-108651</td>
<td>Extraordinary additional course in the module Cross-Functional Management Accounting</td>
<td>4,5 CR</td>
<td>Wouters</td>
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</table>

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

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

Prerequisites
The course "Advanced Management Accounting" is compulsory. The additional courses can only be chosen after the compulsory course has been completed successfully.

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

Recommendation
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Data Science: Advanced CRM [M-WIWI-101470]

**Responsible:** Prof. Dr. Andreas Geyer-Schulz

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration
- Compulsory Elective Modules (Betriebswirtschaftslehre)

### Election block: Wahlpflichtangebot (9 credits)

<table>
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<tr>
<th>Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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</thead>
<tbody>
<tr>
<td>T-WIWI-109921</td>
<td>Advanced Machine Learning</td>
<td>4,5 CR</td>
<td>Deutsch</td>
<td>4</td>
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<tr>
<td>T-WIWI-102762</td>
<td>Business Dynamics</td>
<td>4,5 CR</td>
<td>Deutsch</td>
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<tr>
<td>T-WIWI-103549</td>
<td>Intelligent CRM Architectures</td>
<td>4,5 CR</td>
<td>Deutsch</td>
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<tr>
<td>T-WIWI-102848</td>
<td>Personalization and Services</td>
<td>4,5 CR</td>
<td>Deutsch</td>
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<td>T-WIWI-102847</td>
<td>Recommender Systems</td>
<td>4,5 CR</td>
<td>Deutsch</td>
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<td>T-WIWI-105778</td>
<td>Service Analytics A</td>
<td>4,5 CR</td>
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**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 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

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

**Prerequisites**
None

**Content**

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

**Recommendation**
None

**Annotation**
The module has been renamed to "Data Science: Advanced CRM" in winter term 2016/2017.
Workload
The total workload for this module is approximately 270 hours. For further information see German version.
### 6.17 Module: Data Science: Data-Driven Information Systems [M-WIWI-103117]

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

**Organisation:** KIT Department of Economics and Management

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

<table>
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<tr>
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<td>4</td>
<td>5</td>
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</tbody>
</table>

| T-WIWI-109863 | Business Data Analytics: Application and Tools | 4,5 CR | Weinhardt |
| T-WIWI-106187 | Business Data Strategy | 4,5 CR | Weinhardt |
| T-WIWI-105777 | Business Intelligence Systems | 4,5 CR | Mädche, Nadj, Toreini |
| T-WIWI-106207 | Practical Seminar: Data-Driven Information Systems | 4,5 CR | Mädche, Setzer, Weinhardt |
| T-WIWI-105778 | Service Analytics A | 4,5 CR | Fromm, Setzer |

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

**Competence Goal**
The student

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

**Prerequisites**
None.
Content
The amount of business-related data available in modern enterprise information systems grows exponentially, and the various data sources are more and more integrated, transformed, and analyzed jointly to gain valuable business insights, pro-actively control and manage business processes, to leverage planning and decision making, and to provide appropriate, potentially novel services to customers based on relationships and developments observed in the data.

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

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

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

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

Texteintrag

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

Annotation
The course „Business Data Strategy“ can be chosen from winter term 2016 on.
Module: Data Science: Data-Driven User Modeling [M-WIWI-103118]

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

Election block: Wahlpflichtangebot (at least 9 credits)

<table>
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<td>T-WIWI-102614</td>
<td>Experimental Economics</td>
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<td>Modeling and Analyzing Consumer Behavior with R</td>
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<td>Practical Seminar: Advanced Analytics</td>
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<td>4,5</td>
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<td>T-WIWI-109863</td>
<td>Business Data Analytics: Application and Tools</td>
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Competence Certificate
The assessment is carried out as partial exams of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Prerequisites
None

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

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

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

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

Recommendation
Basic knowledge of Information Management, Operations Research, Descriptive Statistics, and Inferential Statistics is assumed.
Module: Data Science: Evidence-based Marketing [M-WIWI-101647]

**Responsible:** Prof. Dr. Martin Klarmann

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration

**Compulsory Elective Modules (Betriebswirtschaftslehre)**

- **Credits**
- **Recurrence**
- **Language** Deutsch
- **Level** 4
- **Version** 5

### Election block: Wahlpflichtangebot (9 credits)

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<td>T-WIWI-107720</td>
<td>Market Research</td>
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**Competence Certificate**

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

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

**Competence Goal**

**Students**

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

**Prerequisites**

Keine.

**Content**

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

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

**Recommendation**

None

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Design, Construction, Operation and Maintenance of Highways [M-BGU-100998]

Responsible: Prof. Dr.-Ing. Ralf Roos

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

Credits | Recurrence | Duration | Language | Level | Version
--- | --- | --- | --- | --- | ---
9 | Each summer term | 1 semester | Deutsch | 4 | 2

Mandatory

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<tr>
<td>T-BGU-106300</td>
<td>Infrastructure Management</td>
<td>6 CR</td>
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</table>

Competence Goal
See German version.

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

Modelled conditions
The following conditions have to be fulfilled:

1. The module M-BGU-100999 - Highway Engineering must not have been started.

Recommendation
None

Annotation
None

Workload
See German version.
6.21 Module: Designing Interactive Information Systems [M-WIWI-104080]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Usage from 4/1/2018)
Compulsory Elective Modules (Betriebswirtschaftslehre) (Usage from 4/1/2018)

Credits 9
Language Deutsch/Englisch
Level 4
Version 1

Mandatory
T-WIWI-108461 Interactive Information Systems 4,5 CR Mädche, Morana

Elective block: Ergänzungsangebot (at most 4,5 credits)
T-WIWI-105773 Digital Service Design 4,5 CR Mädche
T-WIWI-108437 Practical Seminar: Information Systems and Service Design 4,5 CR Mädche

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

Competence Goal
The student

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

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

Modelled conditions
The following conditions have to be fulfilled:

1. The module M-WIWI-103200 - Designing Interactive Systems must not have been started.

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

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

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

Annotation

Workload
The total workload for this module is approximately 270 hours.
6.22 Module: Digital Service Systems in Industry [M-WIWI-102808]

Responsible: Prof. Dr. Wolf Fichtner  
Prof. Dr. Stefan Nickel

Organisation: KIT Department of Economics and Management
Part of: Compulsory Elective Modules (Betriebswirtschaftslehre)

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Election block: Wahlpflichtangebot (9 credits)

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<td>Industrial Services</td>
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<td>T-WIWI-107043</td>
<td>Liberalised Power Markets</td>
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<td>T-WIWI-106200</td>
<td>Modeling and OR-Software: Advanced Topics</td>
<td>4.5</td>
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<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
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<td>Practical Seminar Digital Service Systems</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

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

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

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

Recommendation
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
### 6.23 Module: Disruptive FinTech Innovations [M-WIWI-103261]

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

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<td>T-WIWI-106496</td>
<td>Computational FinTech with Python and C++</td>
<td>1.5</td>
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<td>T-WIWI-106495</td>
<td>Automated Financial Advisory</td>
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**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 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 with a strong technological background and/or a strong interest for software development and investments will learn how to build a prototype that automates essential steps for a fully automated investment and risk management process. Students also learn to organize themselves efficiently in teams of several developers in order to complete a prototype in a limited amount of time. Moreover, students deepen their understanding of finance and technology and learn how to combine both in an effective way. Students will hence be well prepared to become leaders and pioneers for upcoming FinTech innovations (and beyond) to help society to better invest for the future and to better protect from adverse risks.

**Prerequisites**

None.

**Content**

Within the scope of the lecture "Engineering FinTech Solutions" students get the opportunity to solve a partial problem from a larger FinTech problem independently and at the same time with close mentoring - by employees and professor of the C-RAM research group. The student is introduced to the problem to be solved on the basis of his very own level of knowledge and equipped with the necessary aids. Students are given the opportunity to combine new research approaches from the field of risk and investment management with modern information technology in order to independently master a step towards prototype development. Depending on the topic, students work alone or in teams. As part of the close mentoring approach, teams will meet weekly to discuss their progress and open questions with course students and the professor.

In the course "Computational FinTech with Python and C++" students are given individually tailored programming tasks at the beginning of the semester.

The contents of the seminar "Automated Financial Advisory" will be discussed with the students at the beginning of the semester.

**Recommendation**

None.

**Annotation**

See respective lecture.

**Workload**

The total workload for this module is approximately 270 hours. For further information, see respective lecture.
Module: Econometrics and Statistics I [M-WIWI-101638]

**Responsibility:** Prof. Dr. Melanie Schienle

**Organisation:** KIT Department of Economics and Management

**Part of:** Compulsory Elective Modules (Statistik)

<table>
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**Election block: Ergänzungsangebot (between 4,5 and 5 credits)**

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<td>Data Mining and Applications</td>
<td>4,5 CR</td>
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<td>Financial Econometrics</td>
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<td>T-WIWI-103126</td>
<td>Non- and Semiparametrics</td>
<td>4,5 CR</td>
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<td>T-WIWI-103127</td>
<td>Panel Data</td>
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<td>T-WIWI-103065</td>
<td>Statistical Modeling of Generalized Regression Models</td>
<td>4,5 CR</td>
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**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 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 shows an in depth understanding of advanced Econometric techniques suitable for different types of data. He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

**Prerequisites**

The course “Advanced Statistics” [2520020] is compulsory and must be examined.

**Content**

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

**Workload**

The total workload for this module is approximately 270 hours.
Module: Econometrics and Statistics II [M-WIWI-101639]

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

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**Election block: Wahlpflichtangebot (between 9 and 10 credits)**

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<td>Financial Econometrics</td>
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<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</td>
<td>4,5</td>
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<td>Non- and Semiparametrics</td>
<td>4,5</td>
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<td>Portfolio and Asset Liability Management</td>
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<td>4,5</td>
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<td>T-WIWI-103129</td>
<td>Stochastic Calculus and Finance</td>
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**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 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 shows an in-depth understanding of advanced Econometric techniques suitable for different types of data. He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

**Prerequisites**

This module can only be passed if the module “Econometrics and Statistics I” has been finished successfully before.

**Modelled conditions**

The following conditions have to be fulfilled:

1. The module M-WIWI-101638 - Econometrics and Statistics I must have been started.

**Content**

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

**Workload**

The total workload for this module is approximately 270 hours.
Module: Economic Theory and its Application in Finance [M-WIWI-101502]

**Responsible:** Prof. Dr. Kay Mitusch

**Organisation:** KIT Department of Economics and Management

**Part of:** Economics

**Compulsory Elective Modules (Volkswirtschaftslehre)**

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**Election block: Ergänzungsangebot (1 item)**

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<td>T-WIWI-109050</td>
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**Election block: Wahlpflichtangebot (1 item)**

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**Competence Certificate**

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

**Competence Goal**

The students

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

**Prerequisites**

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

**Content**

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

**Workload**

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

**Responsible:** Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration (Usage from 10/1/2017)
Compulsory Elective Modules (Betriebswirtschaftslehre) (Usage from 10/1/2017)

**Credits** 9  **Language** Deutsch  **Level** 4  **Version** 1

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<td>T-WIWI-107503 Energy Networks and Regulation 4,5 CR Weinhardt</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**
The student

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

**Prerequisites**
None.

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

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
6.28 Module: Electives in Informatics [M-WIWI-101630]

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

**Organisation:**
KIT Department of Economics and Management

**Part of:**
Compulsory Elective Modules (Informatik)

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**Election block: Wahlpflichtangebot ()**

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<td>Critical Information Infrastructures</td>
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<td>Sunyaev</td>
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<td>Digital Health</td>
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<td>Enterprise Architecture Management</td>
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**Election block: Praktikum ()**

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

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

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

Competence Goal
The student

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

Prerequisites
None.

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

Annotation
The course T-WIWI-102759 "Requirements Analysis and Requirements Management" 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.
Module: Electronic Markets [M-WIWI-101409]

Responsible: Prof. Dr. Andreas Geyer-Schulz

Organisation: KIT Department of Economics and Management

Part of: Business Administration
Compulsory Elective Modules (Betriebswirtschaftslehre)

Election block: Wahlpflichtangebot (at least 9 credits)

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

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

Competence Goal
The student

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

Prerequisites
None
Content
What are the conditions that make electronic markets develop and how can one analyse and optimize such markets? In this module, the selection of the type of organization as an optimization of transaction costs is treated. Afterwards, the efficiency of electronic markets (price, information and allocation efficiency) as well as reasons for market failure are described. Finally, motivational issues like bounded rationality and information asymmetries (private information and moral hazard), as well as the development of incentive schemes, are presented. Regarding the market design, especially the interdependencies of market organization, market mechanisms, institutions and products are described and theoretical foundations are lectured.

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

Topics include:

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

Recommendation
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
6.30 Module: Emphasis in Informatics [M-WIWI-101628]

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

**Organisation:**
KIT Department of Economics and Management

**Part of:**
Compulsory Elective Modules (Informatik)

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**Election block: Wahlpflichtangebot (between 1 and 3 items)**

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

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

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

Prerequisites
None.

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

Annotation
The course T-WIWI-102759 "Requirements Analysis and Requirements Management" 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.
Module: Energy and Process Technology I [M-MACH-101296]

**Responsible:** Heiner Wirbser

**Organisation:** KIT Department of Mechanical Engineering

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

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

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

**Prerequisites**
None

**Content**
Energy and Process Technology 1:
1. thermodynamic basics and cycle processes (ITT)
2. basics of piston engines (IFKM)
3. basics of turbomachines (FSM)
4. basics of thermal turbomachines (ITS)

**Annotation**
All lectures and exams are held in German only.
6.32 Module: Energy and Process Technology II [M-MACH-101297]

**Responsible:** Heiner Wirbser

**Organisation:** KIT Department of Mechanical Engineering

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

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

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

**Prerequisites**
None

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

**Annotation**
All lectures and exams are hold in German only.

**Responsible:** Prof. Dr. Wolf Fichtner

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration

**Compulsory Elective Modules (Betriebswirtschaftslehre)**

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<th>Level</th>
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**Mandatory**

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<tr>
<td>T-WIWI-107043</td>
<td>Liberalised Power Markets</td>
<td>3 CR</td>
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**Election block: Ergänzungsangebot (at least 6 credits)**

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<tr>
<td>T-WIWI-102691</td>
<td>Energy Trade and Risk Management</td>
<td>4 CR</td>
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<tr>
<td>T-WIWI-107501</td>
<td>Energy Market Engineering</td>
<td>4,5 CR</td>
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<td>T-WIWI-108016</td>
<td>Simulation Game in Energy Economics</td>
<td>3 CR</td>
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<td>T-WIWI-107446</td>
<td>Quantitative Methods in Energy Economics</td>
<td>3 CR</td>
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<td>T-WIWI-102712</td>
<td>Regulation Theory and Practice</td>
<td>4,5 CR</td>
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**Competence Certificate**

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

**Competence Goal**

The student

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

**Prerequisites**

The lecture Liberalised Power Markets has to be examined.

**Content**

Liberalised Power Markets: The European liberalisation process, energy markets, pricing, market failure, investment incentives, market power

Energy Trade and Risk Management: trade centres, trade products, market mechanisms, position and risk management

Simulation Game in Energy Economics: Simulation of the German electricity system

**Recommendation**

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

**Annotation**

From winter term 2017/2018 the course T-WIWI-102607Energy Policy will not be offered anymore in this module.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.34 Module: Energy Economics and Technology [M-WIWI-101452]

**Responsible:** Prof. Dr. Wolf Fichtner

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration

Compulsory Elective Modules (Betriebswirtschaftslehre)

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Election block: Wahlpflichtangebot (at least 9 credits)

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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>T-WIWI-102793</td>
<td>Efficient Energy Systems and Electric Mobility</td>
<td>3,5 CR</td>
<td>Jochem</td>
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<tr>
<td>T-WIWI-102650</td>
<td>Energy and Environment</td>
<td>4,5 CR</td>
<td>Karl</td>
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<td>T-WIWI-102830</td>
<td>Energy Systems Analysis</td>
<td>3 CR</td>
<td>Ardone</td>
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<td>T-WIWI-107464</td>
<td>Smart Energy Infrastructure</td>
<td>3 CR</td>
<td>Ardone, Pustisek</td>
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<tr>
<td>T-WIWI-102695</td>
<td>Heat Economy</td>
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**Competence Certificate**

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

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

**Competence Goal**

The student

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

**Prerequisites**

None

**Content**

*Heat Economy:* district heating, heating technologies, reduction of heat demand, statutory provisions

*Energy Systems Analysis:* Interdependencies in energy economics, energy systems modelling approaches in energy economics

*Energy and Environment:* emission factors, emission reduction measures, environmental impact

*Efficient Energy Systems and Electric Mobility:* concepts and current trends in energy efficiency, Overview of and economical, ecological and social impacts through electric mobility

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

**Responsible:** Prof. Dr. Orestis Terzidis

**Organisation:** KIT Department of Economics and Management

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

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<td>2 semester</td>
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**Election block: Pflichtbestandteil (1 item)**

- T-WIWI-102864  Entrepreneurship  3 CR  Terzidis

**Election block: Wahlpflichtangebot (1 item)**

- T-WIWI-102865  Business Planning  3 CR  Terzidis
- T-WIWI-102866  Design Thinking  3 CR  Terzidis
- T-WIWI-102833  Entrepreneurial Leadership & Innovation Management  3 CR  Linz, Terzidis
- T-WIWI-102894  Entrepreneurship Research  3 CR  Terzidis

**Election block: Ergänzungsangebot (1 item)**

- T-WIWI-102612  Managing New Technologies  3 CR  Reiß
- T-WIWI-102639  Business Models in the Internet: Planning and Implementation  4,5 CR  Weinhardt
- T-WIWI-102851  Developing Business Models for the Semantic Web  3 CR  Studer
- T-WIWI-102852  Case Studies Seminar: Innovation Management  3 CR  Weissenberger-Eibl
- T-WIWI-102853  Roadmapping  3 CR  Koch
- T-WIWI-102833  Entrepreneurial Leadership & Innovation Management  3 CR  Linz, Terzidis
- T-WIWI-102865  Business Planning  3 CR  Terzidis
- T-WIWI-102866  Design Thinking  3 CR  Terzidis
- T-WIWI-102894  Entrepreneurship Research  3 CR  Terzidis
- T-WIWI-109064  Joint Entrepreneurship Summer School  6 CR  Terzidis

**Competence Certificate**

See German version.

**Competence Goal**

See German version.

**Prerequisites**

None

**Recommendation**

None

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
## 6.36 Module: Environmental Economics [M-WIWI-101468]

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

<table>
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**Election block: Wahlpflichtangebot (at least 9 credits)**

| T-WIWI-102615 | Environmental Economics and Sustainability | 5 CR | Walz |
| T-WIWI-102616 | Environmental and Resource Policy | 4 CR | Walz |
| T-WIWI-102650 | Energy and Environment | 4,5 CR | Karl |
| T-WIWI-100007 | Transport Economics | 4,5 CR | Mitusch, Szimba |
| T-INFO-101348 | Environmental Law | 3 CR | Bäcker |

**Competence Certificate**

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

**Competence Goal**

The students

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

**Prerequisites**

None

**Content**

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

**Recommendation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Experimental Economics [M-WIWI-101505]

**Responsible:** Prof. Dr. Johannes Philipp Reiß

**Organisation:** KIT Department of Economics and Management

**Part of:** Economics

**Compulsory Elective Modules (Volkswirtschaftslehre)**

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**Election block: Wahlpflichtangebot (2 items)**

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<td>Predictive Mechanism and Market Design</td>
<td>4,5</td>
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<td>T-WIWI-102863</td>
<td>Topics in Experimental Economics</td>
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<td>4,5</td>
<td>Reiß</td>
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<td>T-WIWI-105781</td>
<td>Incentives in Organizations</td>
<td>4,5</td>
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<td>Experimental Economics</td>
<td>4,5</td>
<td>4,5</td>
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**Competence Certificate**

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

**Competence Goal**

Students

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

**Prerequisites**

None.

**Content**

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

**Recommendation**

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

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Extracurricular Module in Engineering [M-WIWI-101404]

**Responsible:** Prüfungsausschuss der KIT-Fakultät für Wirtschaftswissenschaften

**Organisation:** KIT Department of Economics and Management

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

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**Election block: Wahlpflichtangebot (between 9 and 12 credits)**

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<td>PH APL-ING-TL01</td>
<td>3 CR</td>
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<td>T-WIWI-106292</td>
<td>PH APL-ING-TL02</td>
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<td>T-WIWI-106293</td>
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<tr>
<td>T-WIWI-108384</td>
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<td>3 CR</td>
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**Competence Certificate**
The assessment of the module is determined by the respective module coordinator. 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**
See German version.
6.39 Module: Finance 1 [M-WIWI-101482]

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

**Organisation:** KIT Department of Economics and Management

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

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**Election block: Wahlpflichtangebot (9 credits)**

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<tr>
<td>T-WIWI-102643</td>
<td>Derivatives</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102621</td>
<td>Valuation</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>Ruckes</td>
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<tr>
<td>T-WIWI-102647</td>
<td>Asset Pricing</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>Ruckes, Uhrig-Homburg</td>
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</table>

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

**Prerequisites**

None

**Content**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.40 Module: Finance 2 [M-WIWI-101483]

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

**Organisation:** KIT Department of Economics and Management

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

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**Election block: Wahlpflichtangebot (9 credits)**

<table>
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<td>Asset Pricing</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>Ruckes, Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-108880</td>
<td>Blockchains &amp; Cryptofinance</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>Schuster, Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102625</td>
<td>Exchanges</td>
<td>1,5 CR</td>
<td>Each term</td>
<td>Franke</td>
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<td>T-WIWI-102622</td>
<td>Corporate Financial Policy</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>Ruckes</td>
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<td>T-WIWI-109050</td>
<td>Corporate Risk Management</td>
<td>4,5 CR</td>
<td>Each term</td>
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<td>T-WIWI-102643</td>
<td>Derivatives</td>
<td>4,5 CR</td>
<td>Each term</td>
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<td>T-WIWI-109941</td>
<td>eFinance: Information Systems for Securities Trading</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>Weinhardt</td>
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<td>T-WIWI-102644</td>
<td>Fixed Income Securities</td>
<td>4,5 CR</td>
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<td>T-WIWI-102900</td>
<td>Financial Analysis</td>
<td>4,5 CR</td>
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<td>4,5 CR</td>
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<td>3 CR</td>
<td>Each term</td>
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<td>Each term</td>
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**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 separately.

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

**Competence Goal**

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

**Prerequisites**

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

**Modelled conditions**

The following conditions have to be fulfilled:

1. The module M-WIWI-101482 - Finance 1 must have been started.

**Content**

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

**Annotation**

The courses eFinance: Information Engineering and Management for Securities Trading [2540454] and Financial Analysis [2530205] can be chosen from summer term 2015 on.
**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
6.41 Module: Finance 3 [M-WIWI-101480]

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

**Organisation:** KIT Department of Economics and Management  
Part of: Business Administration  
Compulsory Elective Modules (Betriebswirtschaftslehre)

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<td>Each term</td>
<td>1 semester</td>
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**Election block: Wahlpflichtangebot (at least 9 credits)**

<table>
<thead>
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<th>Course Title</th>
<th>Credits</th>
<th>Responsible</th>
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<tbody>
<tr>
<td>T-WIWI-102647</td>
<td>Asset Pricing</td>
<td>4,5 CR</td>
<td>Ruckes, Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-108880</td>
<td>Blockchains &amp; Cryptofinance</td>
<td>4,5 CR</td>
<td>Schuster, Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102625</td>
<td>Exchanges</td>
<td>1,5 CR</td>
<td>Franke</td>
</tr>
<tr>
<td>T-WIWI-102622</td>
<td>Corporate Financial Policy</td>
<td>4,5 CR</td>
<td>Ruckes</td>
</tr>
<tr>
<td>T-WIWI-109050</td>
<td>Corporate Risk Management</td>
<td>4,5 CR</td>
<td>Ruckes</td>
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<tr>
<td>T-WIWI-102643</td>
<td>Derivatives</td>
<td>4,5 CR</td>
<td>Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-109941</td>
<td>eFinance: Information Systems for Securities Trading</td>
<td>4,5 CR</td>
<td>Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-102644</td>
<td>Fixed Income Securities</td>
<td>4,5 CR</td>
<td>Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102900</td>
<td>Financial Analysis</td>
<td>4,5 CR</td>
<td>Luedecke</td>
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<tr>
<td>T-WIWI-102623</td>
<td>Financial Intermediation</td>
<td>4,5 CR</td>
<td>Ruckes</td>
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<tr>
<td>T-WIWI-102626</td>
<td>Business Strategies of Banks</td>
<td>3 CR</td>
<td>Müller</td>
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<td>T-WIWI-102646</td>
<td>International Finance</td>
<td>3 CR</td>
<td>Uhrig-Homburg</td>
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<td>T-WIWI-102645</td>
<td>Credit Risk</td>
<td>4,5 CR</td>
<td>Uhrig-Homburg</td>
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<td>Valuation</td>
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</table>

**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 separately.

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

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

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

**Modelled conditions**
The following conditions have to be fulfilled:

1. The module M-WIWI-101482 - Finance 1 must have been started.
2. The module M-WIWI-101483 - Finance 2 must have been started.

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
## 6.42 Module: Fundamentals of Transportation [M-BGU-101064]

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

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<th>Level</th>
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**Election block: Pflichtleistung (between 1 and 2 items as well as between 3 and 6 credits)**

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<tbody>
<tr>
<td>T-BGU-106609</td>
<td>Characteristics of Transportation Systems</td>
<td>3 CR</td>
<td>Vortisch</td>
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<tr>
<td>T-BGU-106610</td>
<td>Transportation Systems</td>
<td>3 CR</td>
<td>Vortisch</td>
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</table>

**Election block: Wahlpflicht (between 1 and 2 items as well as between 3 and 6 credits)**

<table>
<thead>
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<th>Code</th>
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<tbody>
<tr>
<td>T-BGU-106611</td>
<td>Freight Transport</td>
<td>3 CR</td>
<td>Chlond</td>
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<td>T-BGU-106301</td>
<td>Long-Distance and Air Traffic</td>
<td>3 CR</td>
<td>Chlond</td>
</tr>
<tr>
<td>T-BGU-101005</td>
<td>Tendering, Planning and Financing in Public Transport</td>
<td>3 CR</td>
<td>Vortisch</td>
</tr>
<tr>
<td>T-BGU-100014</td>
<td>Seminar in Transportation</td>
<td>3 CR</td>
<td>Chlond, Vortisch</td>
</tr>
<tr>
<td>T-WIWI-103174</td>
<td>Seminar Mobility Services (Master)</td>
<td>3 CR</td>
<td>Satzger, Stryja</td>
</tr>
<tr>
<td>T-BGU-103425</td>
<td>Mobility Services and new Forms of Mobility</td>
<td>3 CR</td>
<td>Kagerbauer</td>
</tr>
<tr>
<td>T-BGU-103426</td>
<td>Strategic Transport Planning</td>
<td>3 CR</td>
<td>Waßmuth</td>
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<td>T-BGU-106608</td>
<td>Information Management for public Mobility Services</td>
<td>3 CR</td>
<td>Vortisch</td>
</tr>
</tbody>
</table>

**Competence Goal**
See German version.

**Prerequisites**
None

**Recommendation**
None
6.43 Module: Generation and transmission of renewable power [M-ETIT-101164]

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

**Organisation:** KIT Department of Electrical Engineering and Information Technology

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

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**Election block: Wahlpflichtblock (at least 9 credits)**

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<tbody>
<tr>
<td>T-ETIT-100830</td>
<td>Power Network</td>
<td>6 CR</td>
<td>Leibfried</td>
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<tr>
<td>T-ETIT-101941</td>
<td>Power Transmission and Power Network Control</td>
<td>5 CR</td>
<td>Leibfried</td>
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<tr>
<td>T-ETIT-100724</td>
<td>Photovoltaic System Design</td>
<td>3 CR</td>
<td>Grab, N.N.</td>
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<td>T-ETIT-101915</td>
<td>High-Voltage Test Technique</td>
<td>4 CR</td>
<td>Badent</td>
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</tbody>
</table>

**Competence Goal**

The student

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

**Prerequisites**

None

**Content**

The module deals with wide knowledge about the electrical power engineering. This ranges from the electric power equipment networks in terms of function, structure and interpretation on the calculation of electrical power networks to special areas such as the FACTS elements or power transformers.
Module: Global Production and Logistics [M-MACH-101282]

**Responsible:** Prof. Dr.-Ing. Gisela Lanza

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- Engineering Sciences
- Compulsory Elective Modules (Ingenieurwissenschaften)

<table>
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<tbody>
<tr>
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**Mandatory**

- T-MACH-105158 Global Production and Logistics - Part 1: Global Production 4 CR Lanza
- T-MACH-105159 Global Production and Logistics - Part 2: Global Logistics 4 CR Furmans

**Election block: Globale Produktion und Logistik (Ergänzungsbereich) (1 item)**

- T-MACH-102128 Information Systems and Supply Chain Management 3 CR Kilger
- T-MACH-105188 Integrative Strategies in Production and Development of High Performance Cars 4 CR Schlichtenmayer
- T-MACH-105783 Learning Factory "Global Production" 4 CR Lanza
- T-MACH-105165 Automotive Logistics 4 CR Furmans
- T-WIWI-103091 Production and Logistics Controlling 3 CR Rausch
- T-MACH-102107 Quality Management 4 CR Lanza

**Competence Certificate**

Oral exams: duration approx. 5 min per credit point

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

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

**Competence Goal**

The students

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

**Prerequisites**

None

**Content**

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

**Workload**

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

**Learning type**

Lectures, seminars, workshops, excursions
6.45 Module: Governance, Risk & Compliance [M-INFO-101242]

**Responsible:** Prof. Dr. Thomas Dreier

**Organisation:** KIT Department of Informatics

**Part of:** Compulsory Elective Modules (Recht oder Soziologie)

<table>
<thead>
<tr>
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<th>Duration</th>
<th>Language</th>
<th>Level</th>
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<td>Deutsch</td>
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**Election block: Governance, Risk & Compliance (at least 1 item as well as at least 9 credits)**

<table>
<thead>
<tr>
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<th>Course Title</th>
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<tbody>
<tr>
<td>T-INFO-101316</td>
<td>Law of Contracts</td>
<td>3 CR</td>
<td>Dreier</td>
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<tr>
<td>T-INFO-101288</td>
<td>Corporate Compliance</td>
<td>3 CR</td>
<td>Dreier</td>
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<tr>
<td>T-INFO-108405</td>
<td>Data Protection by Design</td>
<td>3 CR</td>
<td>Raabe</td>
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<tr>
<td>T-INFO-102047</td>
<td>Seminar: Governance, Risk &amp; Compliance</td>
<td>3 CR</td>
<td>Dreier</td>
</tr>
<tr>
<td>T-INFO-109910</td>
<td>IT- Security Law</td>
<td>3 CR</td>
<td>Matz, Raabe</td>
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</tbody>
</table>
Competence Certificate
The assessment is carried out as partial written exams (see the lectures descriptions).
The overall grade for the module is the average of the grades for each course weighted by the credits.

Competence Goal
The student

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

Prerequisites
None

Content
The module includes the contents of the lectures Endogenous Growth Theory [2561503], Spatial Economics [2561260] and International Economic Policy [2560254]. While the first two lectures have a more formal-analytic focus, the third lecture approaches fundamental ideas and problems from the field of international economic policy from a more verbal perspective.
The common underlying principle of all three lectures in this module is that, based on different theoretical models, economic policy recommendations are derived.

Recommendation
Attendance of the course Introduction Economic Policy [2560280] is recommended.
Successful completion of the courses Economics I: Microeconomics and Economics II: Macroeconomics is required.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Handling Characteristics of Motor Vehicles [M-MACH-101264]

**Responsible:** Prof. Dr. Frank Gauterin

**Organisation:** KIT Department of Mechanical Engineering

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

**Credits:** 9  
**Recurrence:** Once  
**Duration:** 1 semester  
**Language:** Deutsch/Englisch  
**Level:** 4  
**Version:** 3

**Election block: Fahrzeugeigenschaften (at least 9 credits)**

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<th>Duration</th>
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<tbody>
<tr>
<td>T-MACH-105152</td>
<td>Handling Characteristics of Motor Vehicles I</td>
<td>3 CR</td>
<td>Unrau</td>
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<td>T-MACH-105153</td>
<td>Handling Characteristics of Motor Vehicles II</td>
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<td>T-MACH-105154</td>
<td>Vehicle Comfort and Acoustics I</td>
<td>3 CR</td>
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<tr>
<td>T-MACH-105155</td>
<td>Vehicle Comfort and Acoustics II</td>
<td>3 CR</td>
<td>Gauterin</td>
<td></td>
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<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I</td>
<td>3 CR</td>
<td>Ammon</td>
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<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering</td>
<td>4,5 CR</td>
<td>Frey, Gauterin, Gießler</td>
<td></td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**
The student

- 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**

**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.
Module: High-Voltage Technology [M-ETIT-101163]

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

Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

<table>
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Mandatory

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<td>T-ETIT-101913</td>
<td>High-Voltage Technology I</td>
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<tr>
<td>T-ETIT-101914</td>
<td>High-Voltage Technology II</td>
<td>4,5 CR</td>
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</table>

Competence Goal

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

Content

The module deals with wide knowledge about the electrical power engineering. This ranges from the electric power equipment networks in terms of function, structure and interpretation on the calculation of electrical power networks to special areas such as the FACTS elements or power transformers.
Module: Highway Engineering [M-BGU-100999]

**Responsible:** Prof. Dr.-Ing. Ralf Roos

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Ingenieurwissenschaften)**

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**Mandatory**

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<tr>
<td>T-BGU-106300</td>
<td>Infrastructure Management</td>
<td>6 CR</td>
<td>Roos</td>
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<tr>
<td>T-BGU-101860</td>
<td>Special Topics in Highway Engineering and Environmental Impact Assessment</td>
<td>3 CR</td>
<td>Roos</td>
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</table>

**Competence Goal**

See German version.

**Prerequisites**

The selection of this module excludes the selection of the module “Design, Construction, Operation and Maintenance of Highways” (WI41NGBGU1).

**Modeled conditions**

The following conditions have to be fulfilled:

1. The module M-BGU-100998 - Design, Construction, Operation and Maintenance of Highways must not have been started.

**Recommendation**

None

**Annotation**

None

**Workload**

See German version.
### Module: Industrial Production II [M-WIWI-101471]

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

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</thead>
<tbody>
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**Mandatory**

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<th>Credit</th>
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<tbody>
<tr>
<td>T-WIWI-102631</td>
<td>Planning and Management of Industrial Plants</td>
<td>5.5 CR</td>
<td>Schultmann</td>
</tr>
</tbody>
</table>

**Election block: Ergänzungsangebot aus dem Modul Industrielle Produktion III (at most 1 item)**

<table>
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<tr>
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<tr>
<td>T-WIWI-102763</td>
<td>Supply Chain Management with Advanced Planning Systems</td>
<td>3.5 CR</td>
<td>Bosch, Göbelt</td>
</tr>
<tr>
<td>T-WIWI-102826</td>
<td>Risk Management in Industrial Supply Networks</td>
<td>3.5 CR</td>
<td>Wiens</td>
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<tr>
<td>T-WIWI-102828</td>
<td>Supply Chain Management in the Automotive Industry</td>
<td>3.5 CR</td>
<td>Heupel, Lang</td>
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<tr>
<td>T-WIWI-103134</td>
<td>Project Management</td>
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<td>Schultmann</td>
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**Election block: Ergänzungsangebot (at most 1 item)**

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<tr>
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<td>Emissions into the Environment</td>
<td>3.5 CR</td>
<td>Karl</td>
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<tr>
<td>T-WIWI-102882</td>
<td>International Management in Engineering and Production</td>
<td>3.5 CR</td>
<td>Sasse</td>
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<td>T-WIWI-103133</td>
<td>Life Cycle Assessment</td>
<td>3.5 CR</td>
<td>Keller</td>
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</tbody>
</table>

**Competence Certificate**

The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course Planning and Managing of Industrial Plants [2581952] and one further single course of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**

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

**Prerequisites**

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

**Content**

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

**Annotation**

Apart from the core course the courses offered are recommendations and can be replaced by courses from the Module Industrial Production III.
Workload
Total effort will account to 270 hours (9 credit points) and can be allocated according to the credit point rating. Therefore, a course with 3.5 credits requires an effort of approximately 105h and a course with 5.5 credits 165h. The total effort for each course consists of attending lectures and tutorials, examination times and the time an average student needs to prepare himself in order to pass the exam with an average grade.
6.51 Module: Industrial Production III [M-WIWI-101412]

**Responsible:** Prof. Dr. Frank Schultmann

**Organisation:** KIT Department of Economics and Management

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

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<tr>
<td>T-WIWI-102632</td>
<td>Production and Logistics Management</td>
<td>5,5 CR</td>
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**Election block: Ergänzungsangebot aus dem Modul Industrielle Produktion II (at most 1 item)**

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<td>Emissions into the Environment</td>
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<td>T-WIWI-102882</td>
<td>International Management in Engineering and Production</td>
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<td>T-WIWI-103133</td>
<td>Life Cycle Assessment</td>
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**Election block: Ergänzungsangebot (at most 1 item)**

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<td>Supply Chain Management with Advanced Planning Systems</td>
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<td>T-WIWI-102826</td>
<td>Risk Management in Industrial Supply Networks</td>
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<td>Supply Chain Management in the Automotive Industry</td>
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<td>T-WIWI-103134</td>
<td>Project Management</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course *Production and Logistics Management* [2581954] and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**

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

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

**Content**

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

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

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

The total number of hours per course results from the effort required to attend the lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.
### Module: Informatics [M-WIWI-101472]

**Responsible:** Prof. Dr. Andreas Oberweis  
Prof. Dr. Harald Sack  
Prof. Dr. York Sure-Vetter  
Prof. Dr.-Ing. Johann Marius Zöllner

**Organisation:** KIT Department of Economics and Management  
**Part of:** Informatics

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#### Election block: Wahlpflichtangebot ()

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<tr>
<td>T-WIWI-109445</td>
<td>Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services</td>
<td>5 CR</td>
<td>Sunyaev</td>
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<tr>
<td>T-WIWI-109248</td>
<td>Critical Information Infrastructures</td>
<td>5 CR</td>
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<tr>
<td>T-WIWI-109246</td>
<td>Digital Health</td>
<td>4 CR</td>
<td>Sunyaev</td>
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<tr>
<td>T-WIWI-109270</td>
<td>Human Factors in Security and Privacy</td>
<td>5 CR</td>
<td>Volkamer</td>
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<tr>
<td>T-WIWI-102680</td>
<td>Computational Economics</td>
<td>5 CR</td>
<td>Shukla</td>
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<tr>
<td>T-WIWI-102661</td>
<td>Database Systems and XML</td>
<td>5 CR</td>
<td>Oberweis</td>
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<tr>
<td>T-WIWI-102668</td>
<td>Enterprise Architecture Management</td>
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<td>T-WIWI-106423</td>
<td>Information Service Engineering</td>
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<td>T-WIWI-102666</td>
<td>Knowledge Discovery</td>
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<td>T-WIWI-102667</td>
<td>Management of IT-Projects</td>
<td>5 CR</td>
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<tr>
<td>T-WIWI-106340</td>
<td>Machine Learning 1 - Basic Methods</td>
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<td>T-WIWI-106341</td>
<td>Machine Learning 2 – Advanced Methods</td>
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<td>Semantic Web Technologies</td>
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<td>T-WIWI-105801</td>
<td>Service Oriented Computing</td>
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<td>Software Quality Management</td>
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<td>Strategic Management of Information Technology</td>
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<td>T-WIWI-103112</td>
<td>Web Science</td>
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#### Election block: Praktikum (between 0 and 1 items)

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<tr>
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<td>Emerging Trends in Critical Information Infrastructures</td>
<td>4 CR</td>
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<tr>
<td>T-WIWI-108439</td>
<td>Advanced Lab Security, Usability and Society</td>
<td>4 CR</td>
<td>Volkamer</td>
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<td>T-WIWI-109786</td>
<td>Advanced Lab Security</td>
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<tr>
<td>T-WIWI-109251</td>
<td>Selected Issues in Critical Information Infrastructures</td>
<td>4 CR</td>
<td>Sunyaev</td>
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<tr>
<td>T-WIWI-109269</td>
<td>Sociotechnical Information Systems Development</td>
<td>4 CR</td>
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</table>
Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

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

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

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


Competence Goal
The student

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

Prerequisites
It is only allowed to choose one lab.

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

Annotation
The course T-WIWI-102759 "Requirements Analysis and Requirements Management" 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.
### Module: Information Engineering [M-WIWI-101411]

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

<table>
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**Mandatory**

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<td>Foundations of Information Systems</td>
<td>5 CR</td>
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**Election block: Ergänzungsangebot (between 4 and 4,5 credits)**

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<td>Energy Market Engineering</td>
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<tr>
<td>T-WIWI-102640</td>
<td>Market Engineering: Information in Institutions</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-109940</td>
<td>Special Topics in Information Systems</td>
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**Competence Certificate**

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

**Competence Goal**

The student

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

**Prerequisites**

The course *Principles of Information Engineering and Management* [2540450] is compulsory and must be examined.

**Content**

In the lecture *Principles of Information Engineering and Management*, a clear distinction of information as a production, competitive, and economic good is introduced. The central role of information is explained through the concept of the "information lifecycle". The single phases from existence/generation through allocation and evaluation until the distribution and usage of information are analyzed from the business administration perspective and the microeconomic perspective.

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

**Recommendation**

None

**Annotation**

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

**Workload**

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

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**Industrial Engineering and Management M.Sc.**  
Module Handbook as of 04.03.2019  
92
Module: Information Systems in Organizations [M-WIWI-104068]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Business Administration (Usage from 4/1/2018)
Compulsory Elective Modules (Betriebswirtschaftslehre) (Usage from 4/1/2018)

Cris: 9  Language: Deutsch  Level: 4  Version: 2

Election block: Wahlpflichtangebot (at least 9 credits)

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<td>4,5 CR</td>
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<tr>
<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
<td>4,5 CR</td>
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<td>T-WIWI-108461</td>
<td>Interactive Information Systems</td>
<td>4,5 CR</td>
<td>Mädche, Morana</td>
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<td>T-WIWI-108437</td>
<td>Practical Seminar: Information Systems and Service Design</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal
The student

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

Prerequisites
None

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

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

Annotation
New module starting summer term 2018.

Workload
The total workload for this module is approximately 270 hours.
Module: Innovation and Growth

**Responsible:** Prof. Dr. Ingrid Ott

**Organisation:** KIT Department of Economics and Management

**Part of:** Economics Compulsory Elective Modules (Volkswirtschaftslehre)

**Credits:** 9

**Recurrence:** Each term

**Duration:** 1 semester

**Level:** 4

**Version:** 3

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<td>T-WIWI-109194 Dynamic Macroeconomics 4,5 CR Brumm</td>
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<tr>
<td>T-WIWI-102785 Theory of Endogenous Growth 4,5 CR Ott</td>
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<td>T-WIWI-102840 Innovation theory and Policy 4,5 CR Ott</td>
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**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 offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**

Students shall be given the ability to

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

**Prerequisites**

None

**Content**

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

**Recommendation**

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

**Workload**

Total expenditure of time for 9 credits: 270 hours

- Attendance time per lecture: 3x14h
- Preparation and wrap-up time per lecture: 3x14h
- Rest: Exam Preparation

The exact distribution is subject to the credits of the courses of the module.
### 6.56 Module: Innovation Economics [M-WIWI-101514]

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

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**Election block: Wahlpflichtangebot (between 9 and 10 credits)**

- T-WIWI-102840 Innovation theory and -Policy
- T-WIWI-102906 Methods in Economic Dynamics
- T-WIWI-109864 Product and Innovation Management
- T-WIWI-102789 Seminar in Economic Policy

**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 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 given the ability to

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

**Prerequisites**

None

**Content**

The module provides students with knowledge about implications of technological and organizational changes. Addressed economic issues are incentives for developing innovations, diffusion processes, and associated effects. In this context the module analyses appropriate policies in the presence of market failures to take corrective action on the market process and thus to increase the dynamic efficiency of economies.

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

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

**Recommendation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
## 6.57 Module: Innovation Management [M-WIWI-101507]

### Responsible:
Prof. Dr. Marion Weissenberger-Eibl

### Organisation:
KIT Department of Economics and Management

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

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</table>

### Competence Certificate
See German version.

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

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

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

### Content
The Innovation Management: Concepts, Strategies and Methods lecture course teaches concepts, strategies and methods which help students to form a systemic understanding of the innovation process and how to shape it. Building on this holistic understanding, the seminar courses then go into the subjects in greater depth and address specific processes and methods which are central to innovation management.
Recommendation
None

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Insurance Management II [M-WIWI-101449]

**Responsible:** Prof. Dr. Ute Werner

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration

Compulsory Elective Modules (Betriebswirtschaftslehre)

<table>
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<tr>
<td>T-WIWI-102601 Insurance Marketing</td>
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<tr>
<td>T-WIWI-102648 Insurance Production</td>
</tr>
<tr>
<td>T-WIWI-102637 Current Issues in the Insurance Industry</td>
</tr>
<tr>
<td>T-WIWI-102636 Insurance Risk Management</td>
</tr>
<tr>
<td>T-WIWI-102649 Risk Communication</td>
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<td>T-WIWI-102797 P&amp;C Insurance Simulation Game</td>
</tr>
<tr>
<td>T-WIWI-102603 Principles of Insurance Management</td>
</tr>
<tr>
<td>T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks</td>
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</tbody>
</table>

**Competence Certificate**
From 01.10.2017 (winter term 2017/2018) the module is no longer available.

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

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

**Competence Goal**
See German version.

**Prerequisites**
It is only possible to choose this module in combination with the module Insurance Management I. The module is passed only after the final partial exam of Insurance Management I has been passed.

**Modelled conditions**
The following conditions have to be fulfilled:

1. The module M-WIWI-101469 - Insurance Management I must have been started.

**Content**
See German version.

**Recommendation**
The courses chosen from the modules Insurance Management I or Insurance Management II are supposed to complement each other. Advice and information is available from the person responsible for the examination process at the Insurance Department of FBV.
Annotation
Please note:

- T-WIWI-102636 Insurance Risk Management will be offered as a seminar starting summer term 2017.
- T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on;
- T-WIWI-102603 Principles of Insurance Management will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102648 Insurance Production will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102636 Insurance Risk Management will be offered latest until summer term 2017 (beginners only);
- T-WIWI-102649 Risk Communication will be offered latest until winter term 2017/2018 (beginners only);
- T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks will be offered latest until summer term 2017 (beginners only).

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
6.59 Module: Integrated Production Planning [M-MACH-101272]

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

Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

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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

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Compulsory Elective Modules (Recht oder Soziologie)

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Election block: Recht des Geistigen Eigentums (at least 1 item as well as at least 9 credits)

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<td>T-INFO-101310</td>
<td>Patent Law</td>
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<td>T-INFO-101313</td>
<td>Trademark and Unfair Competition Law</td>
<td>3</td>
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<td>T-INFO-101307</td>
<td>Internet Law</td>
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<td>T-INFO-108462</td>
<td>Selected legal issues of Internet law</td>
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Prerequisites
None
Competence Certificate
In winter semester 2018/2019 no exam for the courses "Building Intelligent and Robo-Advised Portfolios" and "Computational Risk and Asset Management I / II" will be offered. 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 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 obtain a practical and yet research oriented introduction into the field of quantitative and computational risk and investment management. Students learn how to use concepts from computer science, statistics, OR and economics to build intelligent risk and investment systems. Based on personal preferences, students can specialize within the module on either more practical programming and statistical learning points or more on the economic and mathematical insights and intuition.

After successful completion of the module, students know the industry intuition as well as state-of-the-art academic 'financial engineering' methods necessary to successfully contribute to sustainable and value oriented innovations in the field of intelligent risk and investment advisory.

Prerequisites
None.

Content
The lecture "Building Intelligent and Robo-Advised Portfolios" offers an application-oriented introduction to intelligent and automated portfolio management.

The lectures “Computational Risk and Asset Management” offer an application-oriented introduction to financial market modeling with modern statistical concepts. The acquired knowledge is helpful for quantitative industry internships and jobs, as well as for further quantitative and/or data analysis oriented lectures/seminars/final papers at FBV and other KIT institutes. In terms of content, the student learns to analyze fundamental problems of financial market modeling, such as the prediction of returns, risk distributions and risk premiums, using probabilistic concepts and to solve them independently using modern software. The intuitive and at the same time rigorous interaction of statistical modelling on the one hand and the application to new financial market problems on the other hand characterizes the teaching philosophy of the course. All necessary statistical and financial specific concepts are discussed in the lectures. The students are given numerous possibilities to solve current financial problems independently with modern software. The learning of the programming language Python is part of the teaching program.

Within the scope of the lecture "Engineering FinTech Solutions" students get the opportunity to solve a subproblem from a larger FinTech problem independently and at the same time with close mentoring - by employee and professor of the C-RAM research group. The student is introduced to the problem to be solved on the basis of his very own level of knowledge and equipped with the necessary aids. Students are given the opportunity to combine new research approaches from the field of risk and investment management with modern information technology in order to independently master a step towards prototype development. Depending on the topic, students work alone or in teams. As part of the close mentoring approach, teams will meet weekly to discuss their progress and open questions with course students and the professor.
Recommendation
None

Annotation
See respective lecture

Workload
The total workload for this module is approximately 270 hours. For further information, see respective lecture.
M 6.62 Module: Introduction to Logistics [M-MACH-101263]

**Responsible:** Prof. Dr.-Ing. Kai Furmans  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** Engineering Sciences  
**Compulsory Elective Modules (Ingenieurwissenschaften)**

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**Election block: Pflichtblock (between 1 and 2 items as well as 6 credits)**

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<tbody>
<tr>
<td>T-MACH-102151</td>
<td>Material Flow in Logistic Systems</td>
<td>6</td>
<td>Furmans</td>
</tr>
<tr>
<td>T-MACH-102163</td>
<td>Basics of Technical Logistics</td>
<td>6</td>
<td>Mittwollen, Oellerich</td>
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**Election block: Einführung in die Logistik (Ergänzungsbereich) (1 item)**

<table>
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<th>Course Title</th>
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<tr>
<td>T-MACH-102128</td>
<td>Information Systems and Supply Chain Management</td>
<td>3</td>
<td>Kilger</td>
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<tr>
<td>T-MACH-105151</td>
<td>Energy Efficient Intralogistic Systems</td>
<td>4</td>
<td>Braun, Schöning</td>
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<td>T-MACH-105165</td>
<td>Automotive Logistics</td>
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<td>Furmans</td>
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<td>T-MACH-105175</td>
<td>Airport Logistics</td>
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<td>T-MACH-105187</td>
<td>IT-Fundamentals of Logistics</td>
<td>3</td>
<td>Thomas</td>
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<td>T-MACH-105174</td>
<td>Warehousing and Distribution Systems</td>
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<td>Furmans</td>
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<td>T-MACH-105171</td>
<td>Safety Engineering</td>
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<td>T-WIWI-103091</td>
<td>Production and Logistics Controlling</td>
<td>3</td>
<td>Rausch</td>
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<td>T-MACH-102159</td>
<td>Elements and Systems of Technical Logistics</td>
<td>4</td>
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<td>Elements and Systems of Technical Logistics - Project</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**
The student

- acquires an overview of different logistic questions in practice,
- is able to model logistic systems with adequate accuracy by using simple models,
- is able to handle analytical methods for a performance evaluation of logistic systems,
- is able to identify cause and effects within logistic systems.

**Prerequisites**
none

**Modelled conditions**
You have to fulfill one of 2 conditions:

1. The module M-MACH-101277 - Material Flow in Logistic Systems must not have been started.
2. The module M-MACH-101279 - Technical Logistics must not have been started.

**Content**
The module Introduction to Logistics provides well-founded knowledge in main questions of logistics. In this module, focuses on the acquisition of theoretical basics linked with exemplary practice questions are laid. To gain a deeper understanding, the course is accompanied by exercises and further improved by case studies.

**Workload**
270 hours
Module: Lean Management in Construction [M-BGU-101884]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Ingenieurwissenschaften)***

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<tr>
<td>T-BGU-108000</td>
<td>Lean Construction</td>
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<td>T-BGU-101007</td>
<td>Project Paper Lean Construction</td>
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| Election block: Wahlpflicht (between 1 and 2 items as well as between 3 and 4,5 credits) |
|---|---|---|---|---|
| T-BGU-103430 | Turnkey Construction I - Processes and Methods | 1,5 CR | Haghsheno |
| T-BGU-103431 | Turnkey Construction II - Trades and Technology | 3 CR | Haghsheno |
| T-BGU-103427 | Site Management | 1,5 CR | Haghsheno |
| T-BGU-103429 | Building Laws | 3 CR | Haghsheno |
| T-BGU-103432 | Project Management in Construction and Real Estate Industry I | 3 CR | Haghsheno |
| T-BGU-103433 | Project Management in Construction and Real Estate Industry II | 3 CR | Haghsheno |

**Competence Certificate**

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

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

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

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

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

**Competence Goal**

see German version

**Module grade calculation**

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

**Prerequisites**

The course Lean Construction is compulsory and must be examined.

**Content**

see German version

**Recommendation**

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

**Annotation**

none

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Literature
Module: Logistics in Value Chain Networks [M-MACH-101280]

**Responsible:** Prof. Dr.-Ing. Kai Furmans

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Ingenieurwissenschaften)**

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<td>Deutsch</td>
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<td>3</td>
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</table>

**Election block: Logistik in Wertschöpfungsnetzwerken (Kernbereich) (1 item as well as at least 6 credits)**

- T-MACH-105181 Supply Chain Management (6 CR Alicke)
- T-MACH-102089 Logistics - Organisation, Design and Control of Logistic Systems (6 CR Furmans)

**Election block: Logistik in Wertschöpfungsnetzwerken (Ergänzungsbereich) (1 item as well as at least 3 credits)**

- T-MACH-105174 Warehousing and Distribution Systems (3 CR Furmans)
- T-MACH-105175 Airport Logistics (3 CR Richter)
- T-MACH-105165 Automotive Logistics (4 CR Furmans)
- T-MACH-102128 Information Systems and Supply Chain Management (3 CR Kilger)
- T-WIWI-103091 Production and Logistics Controlling (3 CR Rausch)

**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

- is able to plan logistic systems and evaluate their performance,
- can use approaches of Supply Chain Management within the operational practice,
- identifies, analyses and evaluates risks within logistic systems.

**Prerequisites**

none

**Modelled conditions**

You have to fulfill one of 2 conditions:

1. The module M-MACH-101282 - Global Production and Logistics must have been started.
2. The course T-MACH-102151 - Material Flow in Logistic Systems must have been started.

**Content**

The module *Logistics in value chain networks* provides basics for the main topics of logistics. Within the lecture basic methods for planning and running logistic systems are introduced. Furthermore special issues like supply chain management and risks in logistic systems are focused. To gain a deeper understanding, the course is accompanied by exercises.

**Workload**

270 hours

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Industrial Engineering and Management M.Sc.
Module Handbook as of 04.03.2019
### 6.65 Module: Machine Tools and Industrial Handling [M-MACH-101286]

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

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

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**Mandatory**

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<td>Machine Tools and Industrial Handling</td>
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**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

**Responsible:** Prof. Dr.-Ing. Albert Albers

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences (Usage from 10/1/2018)
Compulsory Elective Modules (Ingenieurwissenschaften) (Usage from 10/1/2018)

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**Mandatory**

| T-MACH-105401 | Integrated Product Development | 16 CR | Albers, Albers Assistenten |

**Competence Certificate**
oral examination (60 minutes)

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

**Prerequisites**
None

**Content**
Organizational integration: integrated product development model, core team management and simultaneous engineering, informational integration: innovation management, cost management, quality management and knowledge management
Personal integration: team development and leadership
Guest lectures from the industry

**Annotation**
The participation in "Integrated Product Development" requires the concurrent participation in lectures (2145156), tutorials (2145157) and project work (2145300).
Due to organizational reasons, the number of participants is limited. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK homepage from april to july. The selection itself is made by Prof. Albers in personal interviews.

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

**Learning type**
lecture
tutorial
product development project
## 6.67 Module: Management Accounting [M-WIWI-101498]

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

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<td>T-WIWI-102801</td>
<td>Management Accounting 2</td>
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**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 summer 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.
Module: Manufacturing Technology [M-MACH-101276]

**Responsible:** Prof. Dr.-Ing. Volker Schulze

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- Engineering Sciences
- Compulsory Elective Modules (Ingenieurwissenschaften)

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**Mandatory**

- T-MACH-102105 Manufacturing Technology

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

**Responsible:** Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration

**Compulsory Elective Modules (Betriebswirtschaftslehre)**

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

### Mandatory

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### Election block: Ergänzungsangebot (4,5 credits)

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### Competence Certificate

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

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

### Competence Goal

The students

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

### Prerequisites

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

### Content

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

### Recommendation

None

### Annotation

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

### Workload

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Marketing Management [M-WIWI-101490]

**Responsible:** Prof. Dr. Martin Klarmann

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration

**Compulsory Elective Modules (Betriebswirtschaftslehre)**

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**Election block: Wahlpflichtangebot (at least 1 item)**

- T-WIWI-107720 Market Research 4,5 CR
- T-WIWI-102883 Pricing 4,5 CR Feurer
- T-WIWI-109864 Product and Innovation Management 3 CR Klarmann

**Election block: Ergänzungsangebot (at most 1 item)**

- T-WIWI-106137 Country Manager Simulation 1,5 CR Feurer
- T-WIWI-102835 Marketing Strategy Business Game 1,5 CR Klarmann

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

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

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

**Prerequisites**
None

**Content**
The aim of this module is to deepen central marketing contents in different areas. Therefore the students can choose between the following marketing courses:

- Product and Innovation Marketing
- Market Research – this course has to be completed successfully by students interested in seminar or master thesis positions at the chair of marketing
- Marketing Strategy Business Game
- Strategic Brand Management

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

**Workload**
The total workload for this module is approximately 270 hours.
Module: Material Flow in Logistic Systems [M-MACH-101277]

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

Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

Mandatory

<table>
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<tr>
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<td>6 CR</td>
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<td>3 CR</td>
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<td>T-MACH-105165</td>
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<td>4 CR</td>
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<td>T-WIWI-103091</td>
<td>Production and Logistics Controlling</td>
<td>3 CR</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student
- acquires 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.
Module: Material Flow in Networked Logistic Systems [M-MACH-101278]

**Responsible:** Prof. Dr.-Ing. Kai Furmans

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences

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<td>6 CR</td>
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**Election block:** Materialfluss in vernetzten Logistiksystemen (at least 3 credits)

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<td>Production and Logistics Controlling</td>
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**Competence Certificate**

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

**Competence Goal**

The student

- acquires in-depth knowledge on the main topics of logistics, gets an overview of different logistic questions in practice,
- is able to evaluate logistic systems by using the learnt methods,
- is able to analyze and explain the phenomena of industrial material and value streams.

**Prerequisites**

The course "Mathematical models and methods for Production Systems" [T-MACH-102151] is compulsory and must be examined.

In combination with this module, the course "Material Flow in Logistics Systems" [T-MACH-102151] must be completed.

**Modelled conditions**

The following conditions have to be fulfilled:

1. The course T-MACH-102151 - Material Flow in Logistic Systems must have been started.

**Content**

The module Material Flow in networked Logistic Systems provides in-depth basics for the main topics of logistics and industrial material and value streams. The obligatory lecture focuses on queuing methods to model production systems. To gain a deeper understanding, the course is accompanied by exercises.

**Recommendation**

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

**Workload**

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

**Learning type**

Lecture, tutorial.
6 MODULES

Module: Mathematical Programming [M-WIWI-101473]

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

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Election block: Wahlpflichtangebot (at most 2 items)
T-WIWI-102719 Mixed Integer Programming I 4.5 CR Stein
T-WIWI-102726 Global Optimization I 4.5 CR Stein
T-WIWI-103638 Global Optimization I and II 9 CR Stein
T-WIWI-102856 Convex Analysis 4.5 CR Stein
T-WIWI-102724 Nonlinear Optimization I 4.5 CR Stein
T-WIWI-103637 Nonlinear Optimization I and II 9 CR Stein
T-WIWI-102855 Parametric Optimization 4.5 CR Stein

Election block: Ergänzungsangebot (at most 2 items)
T-WIWI-106548 Advanced Stochastic Optimization 4.5 CR Rebennack
T-WIWI-102720 Mixed Integer Programming II 4.5 CR Stein
T-WIWI-102727 Global Optimization II 4.5 CR Stein
T-WIWI-102723 Graph Theory and Advanced Location Models 4.5 CR Nickel
T-WIWI-106549 Large-scale Optimization 4.5 CR Rebennack
T-WIWI-103124 Multivariate Statistical Methods 4.5 CR Grothe
T-WIWI-102725 Nonlinear Optimization II 4.5 CR Stein
T-WIWI-102715 Operations Research in Supply Chain Management 4.5 CR Nickel

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 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

• names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
• knows the indispensable methods and models for quantitative analysis,
• models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
• validates, illustrates and interprets the obtained solutions,
• identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Prerequisites
At least one of the courses "Mixed Integer Programming I", "Parametric Optimization", "Convex Analysis", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.
Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous and mixed integer decision variables.
Annotation
The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).
For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Microeconomic Theory [M-WIWI-101500]

**Responsible:** Prof. Dr. Clemens Puppe

**Organisation:** KIT Department of Economics and Management

**Part of:** Economics Compulsory Elective Modules (Volkswirtschaftslehre)

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**Election block: Wahlpflichtangebot (at least 9 credits)**

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**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 separately.

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

**Competence Goal**

Students

- are able to model practical microeconomic problems mathematically and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs.

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

**Prerequisites**

None

**Content**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.75 Module: Microfabrication [M-MACH-101291]

**Responsible:** Prof. Dr. Jan Gerrit Korvink

**Organisation:** KIT Department of Mechanical Engineering

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

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<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology</td>
<td>3 CR</td>
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<tr>
<td>T-MACH-100530</td>
<td>Physics for Engineers</td>
<td>6 CR</td>
<td>Dienwiebel, Gumbsch, Nesterov-Müller, Weygand</td>
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<tr>
<td>T-MACH-102167</td>
<td>Nanotribology and -Mechanics</td>
<td>3 CR</td>
<td>Dienwiebel, Hölscher</td>
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<tr>
<td>T-MACH-102191</td>
<td>Polymers in MEMS B: Physics, Microstructuring and Applications</td>
<td>3 CR</td>
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<td>T-MACH-102192</td>
<td>Polymers in MEMS A: Chemistry, Synthesis and Applications</td>
<td>3 CR</td>
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<td>T-MACH-102200</td>
<td>Polymers in MEMS C: Biopolymers and Bioplastics</td>
<td>3 CR</td>
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<td>T-MACH-105556</td>
<td>Practical Course Polymers in MEMS</td>
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<tr>
<td>T-MACH-109122</td>
<td>X-ray Optics</td>
<td>4 CR</td>
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**Competence Certificate**

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

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

**Competence Goal**

The student

- gains advanced knowledge concerning fabrication techniques in micrometer scale
- acquires knowledge in up-to-date developing research
- can detect and use causal relation in microfabrication process chains.

**Prerequisites**

none

**Modelled conditions**

The following conditions have to be fulfilled:

1. The course T-MACH-102166 - Fabrication Processes in Microsystem Technology must not have been started.

**Content**

This engineering module allows the student to gain advanced knowledge in the area of microfabrication. Different manufacturing methods are described and analyzed in an advanced manner. Necessary interdisciplinary knowledge from physics, chemistry, materials science and also up-to-date developments (nano and x-ray optics) in micro fabrication is offered.

**Workload**

270 hours
Module: Microoptics [M-MACH-101292]

**Responsible:** Prof. Dr. Jan Gerrit Korvink

**Organisation:** KIT Department of Mechanical Engineering

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

<table>
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**Election block: Mikrooptik (at least 9 credits)**

- T-MACH-102164  **Practical Training in Basics of Microsystem Technology**  3 CR  Last
- T-MACH-102165  **Selected Topics on Optics and Microoptics for Mechanical Engineers**  3 CR  Mappes
- T-MACH-101910  **Microactuators**  3 CR  Kohl
- T-ETIT-100741  **Laser Physics**  4 CR  Koos
- T-ETIT-101945  **Optical Waveguides and Fibers**  4 CR  Koos
- T-MACH-109122  **X-ray Optics**  4 CR  Last

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

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

**Competence Goal**
The student

- basic knowlegde for the applications of microoptical systems
- understanding fabrication processes of microoptical elements & systems
- analyzing strengths and weaknesses of lithography processes
- knowledge on the basics of optical sources and detectors and their use in technical systems
- fundamental knowledge on different lasers and their design
- knewlegde on X-ray imaging methodes

**Prerequisites**
none

**Content**
Optical imaging, measuring and sensor systems are a base for modern natural sciences. In particular life sciences and telecommunications have an intrinsic need for the application of optical technologies. Numerous fields of physics and engineering, e.g. astronomy and material sciences, require optical techniques. Micro optical systems are introduced in medical diagnostics and biological sensing as well as in products of the daily life.

In this module, an introduction to the basics of optics is provided; optical effects are presented with respect to their technical use.

Optical elements and instruments are presented. Fabrication processes of micro optical systems and elements, in particular lithography, are discussed.

In addition X-ray optics and X-ray imaging systems are presented as well as elements of optical telecommunication. A closer look on the physics behind lasers, being one of the most important technical light sources, is provided. As high end technology and clean room equipment is present in all the lectures of this module, the students will have a hands-on training with several experiments in micro optics.

**Workload**
270 hours
Module: Microsystem Technology [M-MACH-101287]

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

Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

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Election block: Mikrosystemtechnik (at least 9 credits)

<table>
<thead>
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<th>Course Title</th>
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<td>3 CR</td>
<td>Mappes</td>
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<tr>
<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II</td>
<td>3 CR</td>
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<td>T-MACH-100968</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III</td>
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<td>Bionics for Engineers and Natural Scientists</td>
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<td>Introduction to Microsystem Technology I</td>
<td>3 CR</td>
<td>Badili, Jouda, Korvink</td>
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<td>Microactuators</td>
<td>3 CR</td>
<td>Kohl</td>
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<td>Nanotechnology with Clusterbeams</td>
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<td>Gspann</td>
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<td>T-MACH-102152</td>
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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

None

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
6.78 Module: Mobile Machines [M-MACH-101267]

**Responsible:** Prof. Dr.-Ing. Marcus Geimer

**Organisation:** KIT Department of Mechanical Engineering

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

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**Election block: Mobile Arbeitsmaschinen (at least 9 credits)**

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<th>Responsible</th>
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<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems</td>
<td>5 CR</td>
<td>Geimer, Pult</td>
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<tr>
<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems</td>
<td>4 CR</td>
<td>Geimer, Xiang</td>
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<tr>
<td>T-MACH-102150</td>
<td>BUS-Controls</td>
<td>3 CR</td>
<td>Becker, Geimer</td>
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<tr>
<td>T-MACH-105168</td>
<td>Mobile Machines</td>
<td>9 CR</td>
<td>Geimer</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I</td>
<td>1,5 CR</td>
<td>Zürn</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II</td>
<td>1,5 CR</td>
<td>Zürn</td>
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</table>

**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 separately.

**Competence Goal**
The student

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

**Prerequisites**
None

**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**
Knowledge of Fluid Power Systems are helpful, otherwise it is recommended to take the course Fluid Power Systems [2114093].

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

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

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

The regular processing time takes six months. On a reasoned request of the student, the examination board can extend the processing time of a maximum of three month. If the Master Thesis is not completed in time, this exam is “failed”, unless the student is not being responsible (e.g., maternity leave).

With consent of the examiner, the thesis can be written in English as well. Other languages require besides the consent of the examiner the approval of the examination board. The issue of the Master Thesis may only returned once and only within the first month of processing time. A new topic has to be released within four weeks.

The module grade is the grade for the Master Thesis.

### Competence Goal

The student can independently handle a complex and unfamiliar subject based on scientific criteria and on the current state of research.

He/she is in a position to critically analyze and structure the researched information as well as derive principles and regularities. He/she knows how to apply the thereby achieved results to solve the task at hand. Taking into account this knowledge and his/her interdisciplinary knowledge, he/she can draw own conclusions, derive improvement potentials, propose and implement science-based decisions.

This is basically also done under consideration of social and/or ethical aspects.

He/she can interpret, evaluate and if required, graphically present the obtained results.

He/she is in a position to sensibly structure a research paper, document them and clearly communicate the results in scientific form.

### Prerequisites

Prerequisite for admission to the Master thesis is that 50 percent of the credit points has to be completed.

A written confirmation of the examiner about supervising the Master Thesis is required.

Please pay regard to the institute specific rules for supervising a Master Thesis.

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

The following conditions have to be fulfilled:

1. You need to earn at least 60 credits in the following fields:
   - Business Administration
   - Informatics
   - Engineering Sciences
   - Operations Research
   - Economics
   - Compulsory Elective Modules

**Content**

The Master Thesis is a major scientific work. The topic of the Master Thesis will be chosen by the student themselves and adjusted with the examinor. The topic has to be related to Industrial Engineering and Management and has to refer to subject-specific or interdisciplinary problems.

**Workload**

The total workload for this module is approximately 900 hours. For further information see German version.
Module: Nanotechnology [M-MACH-101294]

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

Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

<table>
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Mandatory

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<tr>
<td>T-MACH-105180</td>
<td>Nanotechnology for Engineers and Natural Scientists</td>
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<td>Dienwiebel, Hölscher, Walheim</td>
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Election block: Nanotechnologie (Ergänzungsbereich) (at least 5 credits)

<table>
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<tr>
<td>T-MACH-102080</td>
<td>Nanotechnology with Clusterbeams</td>
<td>3</td>
<td>Gspann</td>
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<tr>
<td>T-MACH-102167</td>
<td>Nanotribology and -Mechanics</td>
<td>3</td>
<td>Dienwiebel, Hölscher</td>
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<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology</td>
<td>3</td>
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<td>T-MACH-102152</td>
<td>Novel Actuators and Sensors</td>
<td>4</td>
<td>Kohl, Sommer</td>
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<td>Bionics for Engineers and Natural Scientists</td>
<td>3</td>
<td>Hölscher</td>
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<tr>
<td>T-ETIT-100740</td>
<td>Quantum Functional Devices and Semiconductor Technology</td>
<td>3</td>
<td>Koos</td>
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Competence Certificate
The assessment is carried out as partial exams
(according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

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

Prerequisites
none

Content
The module deals with the most important principles and fundamentals of modern nanotechnology. The compulsory module “Nanotechnology with scanning probe methods” introduces the basics of nanotechnology and nanoanalytics. The specific phenomena and properties found in nanoscale systems are the main topic of the module.

Workload
270 hours
Module: Natural Hazards and Risk Management [M-WIWI-104837]

**Responsible:** Prof. Dr. Michael Kunz

**Organisation:** KIT Department of Economics and Management

**Part of:** Engineering Sciences (Usage from 4/1/2019)

**Compulsory Elective Modules (Ingenieurwissenschaften) (Usage from 4/1/2019)**

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**Election block: Wahlpflichtangebot (between 9 and 12 credits)**

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<td>T-BGU-101499</td>
<td>Introduction to Hydrogeology</td>
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<td>T-BGU-108943</td>
<td>Engineering Hydrology</td>
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<td>T-BGU-106597</td>
<td>Management of Water Resources and River Basins</td>
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<td>T-BGU-101859</td>
<td>Morphodynamics</td>
<td>3</td>
<td>3 CR</td>
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<tr>
<td>T-BGU-106620</td>
<td>Examination Prerequisite Environmental Communication</td>
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<td>0 CR</td>
<td>Kämpf</td>
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<td>T-BGU-101676</td>
<td>Environmental Communication</td>
<td>4</td>
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**Competence Certificate**

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

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

**Competence Goal**

See German version

**Prerequisites**

None

**Content**

See German version

**Annotation**

Students, who successfully completed both modules "Understanding and Prediction of Disasters" I and II (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Network Economics [M-WIWI-101406]

**Responsible:** Prof. Dr. Kay Mitusch

**Organisation:** KIT Department of Economics and Management

**Part of:** Economics

**Compulsory Elective Modules (Volkswirtschaftslehre)**

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**Election block: Wahlpflichtangebot (9 credits)**

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<td>Competition in Networks</td>
<td>4,5 CR</td>
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<td>T-WIWI-100007</td>
<td>Transport Economics</td>
<td>4,5 CR</td>
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<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory</td>
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<td>T-WIWI-102712</td>
<td>Regulation Theory and Practice</td>
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<td>Telecommunication and Internet Economics</td>
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**Competence Certificate**

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

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

**Competence Goal**

The students

- have acquired the basic knowledge for a future job in a network company or in a regulatory agency, ministry etc.
- recognize the specific characterizations of network sectors, know fundamental methods for an economic analysis of network sectors and recognize the interfaces for an interdisciplinary cooperation of economists, engineers and lawyers
- understand the interactions between infrastructures, control systems, and the users of networks, especially concerning their implications on investments, price setting and competitive behavior, and they can model or simulate exemplary applications
- can assess the necessity of regulation of natural monopolies and identify regulatory measures that are important for networks.

**Prerequisites**

None

**Content**

The module is concerned with network or infrastructure industries in the economy, e.g. telecommunication, traffic and energy sectors. These sectors are characterized by close interdependencies of operators and users of infrastructure as well as on states. States intervene in various forms, by the public and regulation authorities, due to the importance of network industries and due to limited abilities of markets to work properly in these industries. The students are supposed to develop a broad knowledge of these sectors and of the political options available.

**Recommendation**

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

**Workload**

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

Responsibility: Prof. Dr. Stefan Nickel

Organisation: KIT Department of Economics and Management

Part of: Operations Research

Compulsory Elective Modules (Operations Research) (Usage from 4/1/2016)

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Election block: Wahlpflichtangebot (at most 2 items)

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<td>4,5 CR</td>
<td>Nickel</td>
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<tr>
<td>T-WIWI-106200</td>
<td>Modeling and OR-Software: Advanced Topics</td>
<td>4,5 CR</td>
<td>Nickel</td>
</tr>
<tr>
<td>T-WIWI-102715</td>
<td>Operations Research in Supply Chain Management</td>
<td>4,5 CR</td>
<td>Nickel</td>
</tr>
</tbody>
</table>

Election block: Ergänzungsangebot (at most 2 items)

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>T-WIWI-106546</td>
<td>Introduction to Stochastic Optimization</td>
<td>4,5 CR</td>
<td>Rebennack</td>
</tr>
<tr>
<td>T-WIWI-102718</td>
<td>Discrete-Event Simulation in Production and Logistics</td>
<td>4,5 CR</td>
<td>Nickel</td>
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<tr>
<td>T-WIWI-102719</td>
<td>Mixed Integer Programming I</td>
<td>4,5 CR</td>
<td>Stein</td>
</tr>
<tr>
<td>T-WIWI-102720</td>
<td>Mixed Integer Programming II</td>
<td>4,5 CR</td>
<td>Stein</td>
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<tr>
<td>T-WIWI-106549</td>
<td>Large-scale Optimization</td>
<td>4,5 CR</td>
<td>Rebennack</td>
</tr>
<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management</td>
<td>4,5 CR</td>
<td>Nickel</td>
</tr>
<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management</td>
<td>4,5 CR</td>
<td>Nickel</td>
</tr>
</tbody>
</table>

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 separately.

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

Competence Goal

The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of SCM and their respective optimization problems,
- is acquainted with classical location problem models (in planes, in networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Prerequisites

At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and "Special Topics of Stochastic Optimization (elective)" has to be taken.

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

Exemption for the summer term 2017:

In the summer term 2017, the two OR master modules "Mathematical Optimization" and "Operations Research in Supply Chain Management" can be taken without compulsory courses. This corresponds to the already existing regulation when taking OR modules in the elective area. The derogation does not apply to the winter term 2017/18.

Modelled conditions

The following conditions have to be fulfilled:

1. The module M-WIWI-101415 - Operations Research in Supply Chain Management and Health Care Management must not have been started.
Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

This module considers several areas of SCM. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of Supply Chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of supply chain management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Supply 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
Basic knowledge as conveyed in the module Introduction to Operations Research [WI1OR] is assumed.

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

Workload
Total effort for 9 credits: ca. 270 hours

- Presence time: 84 hours
- Preparation/Wrap-up: 112 hours
- Examination and examination preparation: 74 hours
Module: Optoelectronics and Optical Communication [M-MACH-101295]

**Responsible:** Prof. Dr. Jan Gerrit Korvink

**Organisation:** KIT Department of Mechanical Engineering

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

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<tr>
<td></td>
<td>Deutsch</td>
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**Election block: Optoelektronik und Optische Kommunikationstechnik (Kernbereich) (1 item)**

<table>
<thead>
<tr>
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<th>Course Title</th>
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<tbody>
<tr>
<td>T-ETIT-100639</td>
<td>Optical Transmitters and Receivers</td>
<td>4 CR</td>
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</table>

**Election block: Optoelektronik und Optische Kommunikationstechnik (Ergänzungsbereich) (at least 5 credits)**

<table>
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<tr>
<td>T-MACH-102152</td>
<td>Novel Actuators and Sensors</td>
<td>4 CR</td>
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<tr>
<td>T-ETIT-101938</td>
<td>Communication Systems and Protocols</td>
<td>5 CR</td>
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<tr>
<td>T-ETIT-100741</td>
<td>Laser Physics</td>
<td>4 CR</td>
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<tr>
<td>T-ETIT-100740</td>
<td>Quantum Functional Devices and Semiconductor Technology</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-ETIT-101945</td>
<td>Optical Waveguides and Fibers</td>
<td>4 CR</td>
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**Competence Certificate**

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

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

**Competence Goal**

Student has basic knowledge of optical communication systems and related device and fabrication technologies.

- He/she can apply this knowledge to specific problems.

**Prerequisites**

none

**Content**

This module covers practical and theoretical aspects in the areas of optical communications and optoelectronics. System aspects of communication networks are complemented by fundamental principles and device technologies of optoelectronics as well as and microsystem fabrication technologies.

**Workload**

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

**Responsible:** Dr. Volker Gaukel

**Organisation:** KIT Department of Chemical and Process Engineering

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

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**Mandatory**

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<th>Teacher</th>
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<tr>
<td>T-CIWVT-101874</td>
<td>Principles of Food Process Engineering</td>
<td>9 CR</td>
<td>Gaukel</td>
</tr>
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</table>

**Competence Goal**
See German version.

**Prerequisites**
none
Module: Private Business Law [M-INFO-101216]

**Responsible:** Prof. Dr. Thomas Dreier

**Organisation:** KIT Department of Informatics

**Part of:** Compulsory Elective Modules (Recht oder Soziologie)

<table>
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<th>Version</th>
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<tbody>
<tr>
<td>9</td>
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</table>

**Election block: Recht der Wirtschaftsunternehmen (at least 1 item as well as at least 9 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>T-INFO-101329</td>
<td>Employment Law I</td>
<td>3 CR</td>
<td>Dreier</td>
</tr>
<tr>
<td>T-INFO-101330</td>
<td>Employment Law II</td>
<td>3 CR</td>
<td>Dreier</td>
</tr>
<tr>
<td>T-INFO-101316</td>
<td>Law of Contracts</td>
<td>3 CR</td>
<td>Dreier</td>
</tr>
<tr>
<td>T-INFO-101314</td>
<td>Tax Law II</td>
<td>3 CR</td>
<td>Dietrich, Dreier</td>
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<tr>
<td>T-INFO-101315</td>
<td>Tax Law I</td>
<td>3 CR</td>
<td>Dreier</td>
</tr>
</tbody>
</table>

**Competence Goal**

The student

- has gained in-depth knowledge of German company law, commercial law and civil law;
- is able to analyze, evaluate and solve complex legal and economic relations and problems;
- is well grounded in individual labour law, collective labour law and commercial constitutional law, evaluates and critically assesses clauses in labour contracts;
- recognizes the significance of the parties to collective labour agreements within the economic system and has differentiated knowledge of labour disputes law and the law governing the supply of temporary workers and of social law;
- possesses detailed knowledge of national earnings and corporate tax law and is able to deal with provisions of tax law in a scientific manner and assesses the effect of these provisions on corporate decision-making.

**Prerequisites**

None

**Content**

The module provides the student with knowledge in special matters in business law, like employment law, tax law and business law, which are essential for managerial decisions.
Module: Process Engineering in Construction [M-BGU-101110]

**Mandatory**
- T-BGU-101844 Process Engineering 3 CR Schneider

**Election block: Wahlpflicht (between 2 and 3 items as well as between 6 and 7,5 credits)**
- T-BGU-101845 Construction Equipment 3 CR Gentes
- T-BGU-101832 Operation Methods for Foundation and Marine Construction 1,5 CR Schneider
- T-BGU-101801 Operation Methods for Earthmoving 1,5 CR Schlick
- T-BGU-101846 Tunnel Construction and Blasting Engineering 3 CR Haghsheno
- T-BGU-101847 Project Studies 3 CR Gentes
- T-BGU-101850 Disassembly Process Engineering 3 CR Gentes

**Competence Certificate**
- 'Teilleistung' T-BGU-101844 with written examination according to § 4 Par. 2 No. 1 according to selected course:
  - 'Teilleistung' T-BGU-101845 with written examination according to § 4 Par. 2 No. 1
  - 'Teilleistung' T-BGU-101832 with oral examination according to § 4 Par. 2 No. 2
  - 'Teilleistung' T-BGU-101801 with oral examination according to § 4 Par. 2 No. 2
  - 'Teilleistung' T-BGU-101846 with oral examination according to § 4 Par. 2 No. 2
  - 'Teilleistung' T-BGU-101847 with oral examination according to § 4 Par. 2 No. 2
  - 'Teilleistung' T-BGU-101850 with oral examination according to § 4 Par. 2 No. 2

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

**Competence Goal**
Students understand different processes and the related construction equipment, its technology, capabilities and constraints. Students can define process solutions consisting of machinery and devices. They can evaluate existing processes through knowledge about process performance and operating conditions, and the can identify potential for improvement.

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

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

**Content**
Within the frame of this module, various construction and conditioning processes will be presented as well as performance calculations conducted. Students learn about the construction machinery and devices of these processes. Transmission, generation, conversion and controlling of power are explained with the help of various practical examples. Moreover, the module includes possibilities for an on-site familiarization.

**Recommendation**
none

**Annotation**
None

**Workload**
see German version
Module: Project Management in Construction [M-BGU-101888]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of: Engineering Sciences

Compulsory Elective Modules (Ingenieurwissenschaften)

<table>
<thead>
<tr>
<th>Credits</th>
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<th>Version</th>
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<tr>
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<td>Each winter term</td>
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**Mandatory**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-BGU-103432</td>
<td>Project Management in Construction and Real Estate Industry I</td>
<td>3 CR</td>
<td>Haghsheno</td>
</tr>
<tr>
<td>T-BGU-103431</td>
<td>Turnkey Construction II - Trades and Technology</td>
<td>3 CR</td>
<td>Haghsheno</td>
</tr>
</tbody>
</table>

**Election block: Wahlpflicht (between 1 and 2 items as well as between 3 and 4,5 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-BGU-103427</td>
<td>Site Management</td>
<td>1,5 CR</td>
<td>Haghsheno</td>
</tr>
<tr>
<td>T-BGU-103430</td>
<td>Turnkey Construction I - Processes and Methods</td>
<td>1,5 CR</td>
<td>Haghsheno</td>
</tr>
<tr>
<td>T-BGU-103428</td>
<td>Supplementary Claim Management</td>
<td>1,5 CR</td>
<td>Haghsheno</td>
</tr>
<tr>
<td>T-BGU-103429</td>
<td>Building Laws</td>
<td>3 CR</td>
<td>Haghsheno</td>
</tr>
<tr>
<td>T-BGU-103433</td>
<td>Project Management in Construction and Real Estate Industry II</td>
<td>3 CR</td>
<td>Haghsheno</td>
</tr>
</tbody>
</table>

**Competence Certificate**

- 'Teilleistung' T-BGU-103432 with written examination according to § 4 Par. 2 No. 1
- 'Teilleistung' T-BGU-103431 with oral examination according to § 4 Par. 2 No. 2

according to selected course:

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

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

**Competence Goal**

see German version

**Module grade calculation**

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

**Prerequisites**

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

**Content**

see German version

**Recommendation**

none

**Annotation**

none

**Workload**

see German version
Literature
DIETHELM, G.: Projektmanagement, Band 1: Grundlagen, Verlag Neue Wirtschafts-Briefe, Herne, 2000
ESCHENBRUCH, K.: Recht der Projektsteuerung, Werner Verlag, München, 2003
VOLKMANN, W.: Projektabwicklung, Verlag für Wirtschaft und Verwaltung Hubert Wingen, Essen, 2002
HELLER, Jörg: Sicherung der Nachtragsvergütung nach VOB und BGB, Zeittechnik-Verlag, Neu-Isenburg, 2000
6.89 Module: Public Business Law [M-INFO-101217]

**Responsible:** Prof. Dr. Matthias Bäcker

**Organisation:** KIT Department of Informatics

**Part of:** Compulsory Elective Modules (Recht oder Soziologie)

<table>
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<th>Level</th>
<th>Version</th>
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<td>Each term</td>
<td>1 semester</td>
<td>Deutsch</td>
<td>4</td>
<td>2</td>
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**Election block: Öffentliches Wirtschaftsrecht (at least 1 item as well as at least 9 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course</th>
<th>Credits</th>
<th>Tutor</th>
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<tbody>
<tr>
<td>T-INFO-101309</td>
<td>Telecommunications Law</td>
<td>3 CR</td>
<td>Marsch</td>
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<tr>
<td>T-INFO-101303</td>
<td>Data Protection Law</td>
<td>3 CR</td>
<td>Marsch</td>
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<tr>
<td>T-INFO-101311</td>
<td>Public Media Law</td>
<td>3 CR</td>
<td>Dreier</td>
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<tr>
<td>T-INFO-101312</td>
<td>European and International Law</td>
<td>3 CR</td>
<td>Brühann</td>
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<tr>
<td>T-INFO-101348</td>
<td>Environmental Law</td>
<td>3 CR</td>
<td>Bäcker</td>
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</table>

**Competence Certificate**

see course description.
Module: Real Estate Economics and Sustainability [M-WIWI-101508]

**Responsible:** Prof. Dr David Lorenz

**Organisation:** KIT Department of Economics and Management

**Part of:** Business Administration

**Credits:** 9

**Recurrence:** Each winter term

**Duration:** 2 semester

**Level:** 4

**Version:** 1

**Mandatory**

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<tr>
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<th>Module Name</th>
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<tbody>
<tr>
<td>T-WIWI-102838</td>
<td>Real Estate Economics and Sustainability Part 1: Basics and Valuation</td>
<td>4,5 CR</td>
<td>Lorenz</td>
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<tr>
<td>T-WIWI-102839</td>
<td>Real Estate Economics and Sustainability Part 2: Reporting and Rating</td>
<td>4,5 CR</td>
<td>Lorenz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Competence Certificate**

It is currently unclear whether the course “Real Estate Economics and Sustainability Part 2: Reporting and Rating” can be offered in summer term 2018. It must therefore be expected that the corresponding module M-WIWI-101508 “Real Estate Management and Sustainability” can not be completed according to schedule.

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

The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (Part 1: Basics and Valuation and Part 2: Reporting and Rating) happen in the same semester in which the lectures take place.

Therefore, Part I currently only takes place in the winter semester and Part II takes place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

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

It is possible to include the grade of a seminar paper, dealing with a topic from the area of Real Estate Economics and Sustainability, into the final grade of the module (according to Section 4(2), 3 of the examination regulation). The seminar has a weight of 20 percent.

**Competence Goal**

The student

- possesses an overview of key interrelationships within the real estate industry concerning macro- and microeconomic questions as well as the interaction of the industry's key players;
- is aware of the basics concerning the sustainable development debate and knows about the possible contribution of buildings and the real estate industry to a more sustainable development;
- knows the basics, key methods and tools of property valuation and is able to apply them;
- is aware of the key influencing factors of a building's market value and is able to factor in sustainability considerations into market value estimates;
- possess an overview of important other methods and processes – besides property valuation – which are applied within the real estate industry to assess property related risks (e.g. property ratings) and to communicate property performance towards third parties (e.g. sustainability assessment of buildings and sustainability reporting of companies).

**Prerequisites**

None
Content
The implementation of sustainable development principles within the real estate industry requires taking into account sustainability considerations within real estate related procedures and decision making processes. Within this context, property valuation and valuation professionals play an important role.

Property valuations are carried out in almost any phase of the building life cycle and support, for example, financing as well as by and sell decisions.

Valuation methods and procedures, however, have to be adjusted to changing market participants' preferences and their willingness to pay. For this reason, the issue of “valuation and sustainability” is of particular topicality and relevance.

Within the real estate industry professionals are sought which combine micro- and macroeconomic knowledge and real estate specific expertise with knowledge and skills regarding the sustainability of buildings and building stocks.

The real estate industry offers attractive working and career opportunities. This teaching module / course therefore offers insights into key methods applied within the real estate industry (particularly valuation) and places them into the context of sustainable development. The focus of the module / course, however, is not only on theoretical content but also on the provisioning of linkages to real estate practice; this will be realized, amongst other issues, by practical tutorials which are offered in addition to the course lectures.

Recommendation
A combination with courses in the area of
• Finance
• Insurance
• Civil engineering and architecture
is recommended.

Particularly recommended is the successful completion of the following Bachelor-Modules:
- Real Estate Management I and II
- Design, Construction and Assessment of Green Buildings I and II

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
### Module: Safety, Computing and Law in Highway Engineering [M-BGU-101066]

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

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<tbody>
<tr>
<td>T-BGU-101804</td>
<td>IT-Based Road Design</td>
<td>3</td>
<td>Zimmermann</td>
</tr>
<tr>
<td>T-BGU-101674</td>
<td>Safety Management in Highway Engineering</td>
<td>3</td>
<td>Zimmermann</td>
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<td>T-BGU-106615</td>
<td>Laws concerning Traffic and Roads</td>
<td>3</td>
<td>Hönig</td>
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**Competence Goal**

See German version.

**Prerequisites**

The examination "Design Basics in Highway Engineering" has to be passed. This can be taken either in the module "Design, Construction, Operation and Maintenance of Highways" (Wi4INGBGU1) or can be approved from a previous study (e.g. Civil Engineering BSc at KIT).

**Modelled conditions**

The following conditions have to be fulfilled:

1. The course 0xA5187D70DC806D4FA8066A02A95B7BE3 - must have been passed.

**Recommendation**

None

**Annotation**

None
Module: Sales Management [M-WIWI-101487]

**Responsibility:**
Prof. Dr. Martin Klarmann

**Organisation:**
KIT Department of Economics and Management

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

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**Mandatory Courses**

<table>
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<tr>
<th>Credits</th>
<th>Duration</th>
<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>T-WIWI-102890</td>
<td>Sales Management and Retailing</td>
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<td>Klarmann</td>
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**Election Block: Ergänzungsangebot (at most 1 item)**

<table>
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<tr>
<td>T-WIWI-106137</td>
<td>Country Manager Simulation</td>
<td>1,5</td>
<td>Feurer</td>
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<tr>
<td>T-WIWI-102834</td>
<td>Case Studies in Sales and Pricing</td>
<td>1,5</td>
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<tr>
<td>T-WIWI-106981</td>
<td>Digital Marketing and Sales in B2B</td>
<td>1,5</td>
<td>Konhäuser</td>
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<tr>
<td>T-WIWI-102891</td>
<td>Price Negotiation and Sales Presentations</td>
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**Election Block: Ergänzungsangebot (at most 2 items)**

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<tr>
<td>T-WIWI-102883</td>
<td>Pricing</td>
<td>4,5</td>
<td>Feurer</td>
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</table>

**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.

**Competence Goal**

Students

- have an advanced knowledge about sales management (design and structure of sales systems, relationship with sales partners and important customers)
- have a fundamental understanding of price management (in particular consumer behavior of pricing, pricing strategy, price determination)
- are able to handle particularities and challenges in sales management
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- are able to implement their extensive sales and pricing knowledge in a practical context
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the sales department

**Prerequisites**
The course “Sales Management and Retailing” is compulsory.

**Content**
The aim of the module is to deepen the sales management knowledge of the students. Theoretical approaches often have a combined view on marketing and sales, whereas in practical surroundings the sales department is completely separated from the marketing tasks. Given this fact, we concentrate on pure sales management topics and address different facets of the sales management.

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
### Module: Seminar Module [M-WIWI-101808]

**Responsible:** Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

**Organisation:** KIT Department of Economics and Management

**Part of:** Compulsory Elective Modules (mandatory)

<table>
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**Election block: Seminar Wirtschaftswissenschaften, Mathematik und Recht (between 3 and 6 credits)**

- **T-WIWI-103474** Seminar in Business Administration A (Master)
  - 3 CR

- **T-WIWI-103476** Seminar in Business Administration B (Master)
  - 3 CR

- **T-WIWI-103477** Seminar in Economics B (Master)
  - CR: Brumm, Kowalski, Mitsch, Ott, Puppe, Reiß, Szech, Wigger
  - 3 CR

- **T-WIWI-103478** Seminar in Economics A (Master)
  - CR: Brumm, Kowalski, Mitsch, Ott, Puppe, Reiß, Szech, Wigger
  - 3 CR

- **T-WIWI-103479** Seminar in Informatics A (Master)
  - 3 CR

- **T-WIWI-103480** Seminar in Informatics B (Master)
  - 3 CR

- **T-WIWI-103481** Seminar in Operations Research A (Master)
  - CR: Nickel, Rebennack, Stein
  - 3 CR

- **T-WIWI-103482** Seminar in Operations Research B (Master)
  - CR: Nickel, Rebennack, Stein
  - 3 CR

- **T-WIWI-103483** Seminar in Statistics A (Master)
  - CR: Grothe, Schienle
  - 3 CR

- **T-WIWI-103484** Seminar in Statistics B (Master)
  - CR: Grothe, Schienle
  - 3 CR

- **T-INFO-101997** Seminar: Legal Studies I
  - CR: Dreier
  - 3 CR

- **T-INFO-105945** Seminar: Legal Studies II
  - CR: Dreier
  - 3 CR

**Election block: Seminar Ingenieurwissenschaften (at most 1 item)**

- **T-MACH-102135** Conveying Technology and Logistics
  - CR: Furmans, Pagani
  - 3 CR

- **T-MACH-109062** Seminar Production Technology
  - CR: Fleischer, Lanza, Schulze
  - 3 CR

- **T-MACH-108737** Seminar Data-Mining in Production
  - CR: Lanza
  - 3 CR

- **T-BGU-100014** Seminar in Transportation
  - CR: Chlond, Vortisch
  - 3 CR


<table>
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<tr>
<th>T-WIWI-108763</th>
<th>Seminar in Engineering Science Master (approval)</th>
<th>3 CR</th>
<th>Fachvertreter ingenieurwissenschaftlicher Fakultäten</th>
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<td>T-WIWI-104681</td>
<td>Wildcard Key Competences Seminar 2</td>
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<td>T-WIWI-105956</td>
<td>Wildcard Key Competences Seminar 8</td>
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</table>

**Competence Certificate**

The modul examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examtiation regulation). A detailed description of every singled assessment is given in the specific course characerization.

The final mark for the module is the average of the marks for each of the two seminars weighted by the credits and truncated after the first decimal. Grades of the KQ courses are not included.

**Competence Goal**

- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

**Prerequisites**

The course specific preconditions must be observed.

- **Seminars**: Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.
- Alternatively one of the two seminars can be absolved at a engineering department. The seminar has to be offered by a representative of the respective department as well. The assessment has to meet the demands of the Department of Economics and Management (active participation, term paper with a workload of at least 80 h, presentation). This alternative seminar requires an official approval and can be applied at the examination office of the Department of Economics and Management. Seminars at the institutes wbk and IFL do not require these approval.
- **Key Qualification (KQ)-course(s)**: One or more courses with at least 3 CP in total of additional key qualifications have to be chosen among the courses [HoC, ZAK, Sprachzentrum].

**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.

Besides advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailed description of 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**

The total workload for this module is approximately 270 hours. For further information see German version.
6.94 Module: Sensor Technology I [M-ETIT-101158]

**Responsible:** Dr. Wolfgang Menesklou

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Ingenieurwissenschaften)**

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**Mandatory**

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<td>T-ETIT-101911</td>
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**Election block: Wahlpflicht (at most 2 items as well as at least 6 credits)**

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<td>T-ETIT-100706</td>
<td>Sensors and Actuators Laboratory</td>
<td>6 CR</td>
</tr>
<tr>
<td>T-ETIT-100709</td>
<td>Sensor Systems</td>
<td>3 CR</td>
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<tr>
<td>T-ETIT-100707</td>
<td>Seminar Sensors</td>
<td>3 CR</td>
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<tr>
<td>T-MACH-101910</td>
<td>Microactuators</td>
<td>3 CR</td>
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</table>

**Competence Certificate**

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

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

**Prerequisites**

The course Sensor Technology [23231] is obligatory and has to be attended. The elected courses must not be credited in the module Sensorik II [WI4INGETIT5] or other modules.

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

**Recommendation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.95 Module: Sensor Technology II [M-ETIT-101159]

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

<table>
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<tr>
<td>T-ETIT-100706 Sensors and Actuators Laboratory</td>
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<tr>
<td>T-ETIT-100709 Sensor Systems</td>
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<tr>
<td>T-ETIT-100707 Seminar Sensors</td>
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<tr>
<td>T-MACH-101910 Microactuators</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**
The student

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

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

**Modelled conditions**
The following conditions have to be fulfilled:

1. The module M-ETIT-101158 - Sensor Technology I must have been started.

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

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Service Analytics [M-WIWI-101506]

**6.96 Module: Service Analytics [M-WIWI-101506]**

**Responsible:** Prof. Dr. Hansjörg Fromm  
Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management

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

### Election block: Wahlpflichtangebot (9 credits)

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<tr>
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<td>Mädche, Nadj, Toreini</td>
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<tr>
<td>T-WIWI-102822</td>
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<td>Fromm</td>
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<td>T-WIWI-102899</td>
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<td>Fromm, Setzer</td>
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<td>T-WIWI-109940</td>
<td>Special Topics in Information Systems</td>
<td>4.5 CR</td>
<td>Weinhardt</td>
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### Competence Certificate

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

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

### Competence Goal

**Students**

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

### Prerequisites

None

### Content

The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

### Recommendation

The courses Service Analytics A [2595501] or Service Analytics B [2540498] should be applied.

### 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.
Module: Service Design Thinking [M-WIWI-101503]

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

Organisation: KIT Department of Economics and Management
Part of: Business Administration
Compulsory Elective Modules (Betriebswirtschaftslehre)

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

Mandatory
T-WIWI-102849 Service Design Thinking 9 CR Satzger, Weinhardt

Competence Certificate
The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

Competence Goal
- Deep knowledge of the innovation method Design Thinking, as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Learn to apply the method to a real innovation projects issued by industry partners.

Prerequisites
None

Content
- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (intern. Design Thinking network).
- Design Space Exploration: Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are in the focus of this phase.
- Funky Prototype: Integration of the individually tested and successful functions to several complete solution scenarios, which are further tested and developed.
- Functional Prototype: Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is lade out in detail and tested with users.
- Final Prototype: Implementing the functional prototype and presenting it to the customer.

Recommendation
This course is held in English – proficiency in writing and communication is required.
Our past students recommend to take this course at the beginning of the masters program.

Annotation
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.
Workload
The total amount of work for this module is approx. 270 hours (9 credits). The workload for this course is comparably high as the course runs in cooperation with partner universities from around the world as well as partner companies. This causes overhead.
### Module: Service Economics and Management [M-WIWI-102754]

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

**Organisation:** KIT Department of Economics and Management

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

<table>
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**Election block: Wahlpflichtangebot (9 credits)**

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<th>Code</th>
<th>Course</th>
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<tr>
<td>T-WIWI-102881</td>
<td>Business and IT Service Management</td>
<td>4,5 CR</td>
<td>Satzger</td>
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<tr>
<td>T-WIWI-102640</td>
<td>Market Engineering: Information in Institutions</td>
<td>4,5 CR</td>
<td>Weinhardt</td>
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<tr>
<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
<td>4,5 CR</td>
<td>Mädche</td>
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</table>

**Competence Certificate**

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

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

**Competence Goal**

Students

- understand the scientific basics of the management of digital services and corresponding systems
- gain a comprehensive insight in the importance and the most important features of information systems as a central component of the digitalization of business processes, products and services
- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully
- understand the OR methods in the sector of service management and apply them adequately
- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems
- are able to develop market-oriented coordination mechanisms and apply service systems.

**Prerequisites**

None

**Content**

This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

**Recommendation**

None

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Service Innovation, Design & Engineering [M-WIWI-102806]

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

**Organisation:** KIT Department of Economics and Management

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

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**Election block: Wahlpflichtangebot (9 credits)**

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<td>T-WIWI-102639</td>
<td>Business Models in the Internet: Planning and Implementation</td>
<td>4,5 CR</td>
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<td>T-WIWI-108437</td>
<td>Practical Seminar: Information Systems and Service Design</td>
<td>4,5 CR</td>
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<td>T-WIWI-102799</td>
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<td>Service Innovation</td>
<td>4,5 CR</td>
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**Competence Certificate**

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

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

**Competence Goal**

Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.
- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.
- are able to embed the concepts of innovation management, development and design of services into organisations
- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation
- elaborate concrete and problem-solving solutions for practical tasks in teams.

**Prerequisites**

**Dependencies between courses:**

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

**Content**

This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

**Recommendation**

Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].  
Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

**Annotation**

This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.
Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Service Management [M-WIWI-101448]

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

**Organisation:** KIT Department of Economics and Management

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

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**Mandatory**

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<td>Business and IT Service Management</td>
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**Election block: Ergänzungsangebot (4,5 credits)**

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<tr>
<td>T-WIWI-108715</td>
<td>Artificial Intelligence in Service Systems</td>
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<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
<td>4,5 CR</td>
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<td>T-WIWI-102822</td>
<td>Industrial Services</td>
<td>4,5 CR</td>
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<td>T-WIWI-102899</td>
<td>Modeling and Analyzing Consumer Behavior with R</td>
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<td>T-WIWI-105778</td>
<td>Service Analytics A</td>
<td>4,5 CR</td>
<td>Fromm, Setzer</td>
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<td>Service Innovation</td>
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**Competence Certificate**

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

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

**Competence Goal**

The students

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- systematically use vast amounts of data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

**Prerequisites**

The course *Business and IT Service Management* [2590484] is compulsory and must be examined.

**Content**

The module service management addresses the basics of developing and managing IT-based services. The lectures contained in this module teach the basics of developing and managing IT-based services and the application of OR methods in the field of service management. Moreover, students learn to systematically analyze vast amounts of data for planning, operation and improvement for complex service offerings. These tools enhance operational and strategic decision support and help to analyze and understand the overall innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

**Recommendation**

None

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
### M 6.101 Module: Service Operations [M-WIWI-102805]

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

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#### Election block: Wahlpflichtangebot (at most 2 items)

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<tr>
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<td>Discrete-Event Simulation in Production and Logistics</td>
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<tr>
<td>T-WIWI-102884</td>
<td>Operations Research in Health Care Management</td>
<td>4,5 CR</td>
<td>Nickel</td>
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<td>T-WIWI-102715</td>
<td>Operations Research in Supply Chain Management</td>
<td>4,5 CR</td>
<td>Nickel</td>
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<tr>
<td>T-WIWI-102716</td>
<td>Practical Seminar: Health Care Management (with Case Studies)</td>
<td>4,5 CR</td>
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#### Election block: Ergänzungsangebot (at most 2 items)

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<td>Supply Chain Management in the Process Industry</td>
<td>4,5 CR</td>
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<td>T-WIWI-102872</td>
<td>Challenges in Supply Chain Management</td>
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### Competence Certificate

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

### Competence Goal

Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

### Prerequisites

At least one of the four courses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management or Discrete-Event Simulation in Production and Logistics has to be assigned.

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

### Content

The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

### Recommendation

The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.
Annotation
This module is part of the KSRI teaching profile "Digital Service Systems". Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Sociology [M-GEISTSOZ-101169]

**Responsible:** Prof. Dr. Gerd Nollmann

**Organisation:** KIT Department of Humanities and Social Sciences

**Part of:** Compulsory Elective Modules (Recht oder Soziologie)

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<tr>
<td>T-GEISTSOZ-109052</td>
<td>Application of Social Science Methods (WiWi)</td>
<td>9 CR</td>
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**Competence Goal**

The student

- Gains theoretical and methodical knowledge of social processes and structures,
- learns a script based data analysis tool (R, Stata, Python),
- gathers his/her data within an own framework and/or analyzes complex data,
- is able to present his/her work results in a precise and clear way.

**Prerequisites**

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

**Content**

The Sociology module offers students the opportunity to learn a data analysis tool (R, Stata, Python) within the framework of a two-semester course and to independently transfer this tool to a content-related question. Both the tool and the contents are determined by the lecturers. The contents can refer to the analysis of large population surveys (SOEP, Microcensus, ALLBUS), to own experiments, to own field studies or to Big Data analyses.

**Annotation**

Basic knowledge in multivariate regression and inference statistics is required.
### 6.103 Module: Specialization in Food Process Engineering [M-CIWVT-101119]

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

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<tr>
<td>T-CIWVT-101875</td>
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**Competence Goal**  
See German version.

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

**Content**  
See courses.
### Module: Specialization in Production Engineering [M-MACH-101284]

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

#### Part of:
- Engineering Sciences  
- Compulsory Elective Modules (Ingenieurwissenschaften)

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<th>Level</th>
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**Election block: Vertiefung der Produktionstechnik (at least 9 credits)**

<table>
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<tr>
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<th>Title</th>
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<th>Instructor(s)</th>
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<tr>
<td>T-MACH-105188</td>
<td>Integrative Strategies in Production and Development of High Performance Cars</td>
<td>4 CR</td>
<td>Schlichtenmayer</td>
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<tr>
<td>T-MACH-105783</td>
<td>Learning Factory “Global Production”</td>
<td>4 CR</td>
<td>Lanza</td>
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<tr>
<td>T-MACH-105166</td>
<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry</td>
<td>4 CR</td>
<td>Kienzle, Steegmüller</td>
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<td>T-MACH-108878</td>
<td>Laboratory Production Metrology</td>
<td>4 CR</td>
<td>Häfner</td>
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<tr>
<td>T-MACH-102107</td>
<td>Quality Management</td>
<td>4 CR</td>
<td>Lanza</td>
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<tr>
<td>T-MACH-105185</td>
<td>Control Technology</td>
<td>4 CR</td>
<td>Gönnheimer</td>
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<tr>
<td>T-MACH-105177</td>
<td>Metal Forming</td>
<td>3 CR</td>
<td>Herlan</td>
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<tr>
<td>T-MACH-102148</td>
<td>Gear Cutting Technology</td>
<td>4 CR</td>
<td>Klaiber</td>
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**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 can:

- be able to apply the methods of production science to new problems.  
- be able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.  
- be able to use their knowledge target-oriented to achieve an efficient production technology.  
- be able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.  
- be 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
Module: Specific Topics in Materials Science [M-MACH-101268]

**Responsible:** Prof. Dr. Michael Hoffmann

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Ingenieurwissenschaften)**

<table>
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<td>1 semester</td>
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**Election block: Spezielle Werkstoffkunde (at least 9 credits)**

- T-MACH-102141 Constitution and Properties of Wearresistant Materials 4 CR Ulrich
- T-MACH-100287 Introduction to Ceramics 6 CR Hoffmann
- T-MACH-102099 Experimental Lab Class in Welding Technology, in Groups 4 CR Dietrich
- T-MACH-102111 Principles of Ceramic and Powder Metallurgy Processing 4 CR Schell
- T-MACH-102154 Laboratory Laser Materials Processing 4 CR Schneider
- T-MACH-102102 Physical Basics of Laser Technology 5 CR Schneider
- T-MACH-102137 Polymer Engineering I 4 CR Elsner
- T-MACH-102138 Polymerengineering II 4 CR Elsner
- T-MACH-102103 Superhard Thin Film Materials 4 CR Ulrich
- T-MACH-100531 Systematic Materials Selection 5 CR Dietrich
- 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 Oberacker
- T-MACH-102179 Structural Ceramics 4 CR Hoffmann
- T-MACH-102182 Ceramic Processing Technology 4 CR Binder
- T-MACH-102170 Structural and Phase Analysis 4 CR Wagner
- T-MACH-105150 Constitution and Properties of Protective Coatings 4 CR Ulrich
- T-MACH-105170 Welding Technology 4 CR Farajian
- T-MACH-105164 Laser in Automotive Engineering 4 CR Schneider
- T-MACH-105157 Foundry Technology 4 CR Wilhelm
- T-MACH-105178 Practical Course Technical Ceramics 1 CR Oberacker

**Competence Certificate**

The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module 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 acquire special basic knowledge in selected areas of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

**Prerequisites**

None

**Content**

See courses.

**Workload**

The module requires an average workload of 270 hours.
### 6.106 Module: Stochastic Optimization [M-WIWI-103289]

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

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#### Election block: Wahlpflichtangebot (at most 2 items)

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<td>4.5 CR</td>
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<tr>
<td>T-WIWI-106548</td>
<td>Advanced Stochastic Optimization</td>
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<tr>
<td>T-WIWI-106549</td>
<td>Large-scale Optimization</td>
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#### Election block: Ergänzungsangebot (at most 2 items)

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<td>T-WIWI-102719</td>
<td>Mixed Integer Programming I</td>
<td>4.5 CR</td>
<td>Stein</td>
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<td>T-WIWI-102720</td>
<td>Mixed Integer Programming II</td>
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<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</td>
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<td>Operations Research in Supply Chain Management</td>
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<td>Optimization under Uncertainty</td>
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<td>T-WIWI-106552</td>
<td>Simulation of Stochastic Systems</td>
<td>4.5 CR</td>
<td>Grothe, Rebennack</td>
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#### 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 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

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,
- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

#### Prerequisites

At least one of the courses "Advanced Stochastic Optimization" and "Large-scale Optimization" has to be taken.

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

#### Content

The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

#### Recommendation

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

The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.
6.107 Module: Technical Logistics [M-MACH-101279]

**Responsible:** Prof. Dr.-Ing. Kai Furmans

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences

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**Election block: Technische Logistik (Kernbereich) (1 item as well as at least 6 credits)**

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<td>Warehousing and Distribution Systems</td>
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<td>T-MACH-105151</td>
<td>Energy Efficient Intralogistic Systems</td>
<td>4 CR</td>
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<tr>
<td>T-MACH-102159</td>
<td>Elements and Systems of Technical Logistics</td>
<td>4 CR</td>
</tr>
<tr>
<td>T-MACH-102160</td>
<td>Selected Applications of Technical Logistics</td>
<td>4 CR</td>
</tr>
<tr>
<td>T-MACH-105187</td>
<td>IT-Fundamentals of Logistics</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-103091</td>
<td>Production and Logistics Controlling</td>
<td>3 CR</td>
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<tr>
<td>T-MACH-108946</td>
<td>Elements and Systems of Technical Logistics - Project</td>
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<td>T-MACH-108945</td>
<td>Selected Applications of Technical Logistics - Project</td>
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**Election block: Technische Logistik (Ergänzungsbereich) (1 item as well as at least 3 credits)**

<table>
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<th>Course Title</th>
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<td>Basics of Technical Logistics</td>
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<tr>
<td>T-MACH-105171</td>
<td>Safety Engineering</td>
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<td>T-MACH-105151</td>
<td>Energy Efficient Intralogistic Systems</td>
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<td>T-MACH-102160</td>
<td>Selected Applications of Technical Logistics</td>
<td>2 CR</td>
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**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.

To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the IFL. The term paper may not be convalidated in the seminar module.

**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

**Modelled conditions**
The following conditions have to be fulfilled:

1. The course T-MACH-102163 - Basics of Technical Logistics must not have been started.

**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
Module: Transport Infrastructure Policy and Regional Development [M-WIWI-101485]

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

<table>
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<th>Level</th>
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<td>Each term</td>
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**Election block: Wahlpflichtangebot (2 items)**

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<td>T-WIWI-100007</td>
<td>Transport Economics</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**
The students

- understand the economic issues related to transport and regional development with a main focus on economic policy issues generated by the relationship of transport and regional development with the public sector
- are able to compare different considerations of politics, regulation and the private sector and to analyse and assess the respective decision problems both qualitatively and by applying appropriate methods from economic theory
- are prepared for careers in the public sector, particularly for public companies, politics, regulatory agencies, related consultancies, mayor construction companies or infrastructure project corporations

**Prerequisites**
None

**Content**
The development infrastructure (e.g. transport, energy, telecommunications) has always been one of the most relevant factors for economic development and particularly influences the development of the regional economy. From the repertoire of state actions, investments into transport infrastructure are often regarded the most important measure to foster regional economic growth. Besides the direct effects of transport policy on passenger and freight transport, a variety of individual economic activities is significantly dependent on the available or potential transport options. Decisions on the planning, financing and realization of mayor infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs. Through its combination of lectures the module reflects the complex interdependencies between infrastructure policy, transport industry and regional policy and provides its participants with a comprehensive understanding of the functionalities of one of the most important sectors of the economy and its relevance for economic policy.

**Annotation**
The courses Assessment of Public Policies and Projects I (winter term) and Assessment of Public Policies and Projects II (summer term) will no longer be part of this module. Student who have already had exams in these courses can integrate these exams in this module.

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
6.109 Module: Transportation Modelling and Traffic Management [M-BGU-101065]

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

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Election block: Pfllichtleistung (between 2 and 3 items as well as between 6 and 9 credits)

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<td>T-BGU-101797</td>
<td>Methods and Models in Transportation Planning</td>
<td>3</td>
<td>Vortisch</td>
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<tr>
<td>T-BGU-101798</td>
<td>Traffic Engineering</td>
<td>3</td>
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<tr>
<td>T-BGU-101799</td>
<td>Traffic Management and Transport Telematics</td>
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<td>T-BGU-101800</td>
<td>Traffic Flow Simulation</td>
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Election block: Wahlpflicht (at most 1 item as well as between 0 and 3 credits)

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<td>T-BGU-100010</td>
<td>Transportation Data Analysis</td>
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<td>T-BGU-106611</td>
<td>Freight Transport</td>
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<td>Chlond</td>
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<tr>
<td>T-BGU-106301</td>
<td>Long-Distance and Air Traffic</td>
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<td>Chlond</td>
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<tr>
<td>T-BGU-101005</td>
<td>Tendering, Planning and Financing in Public Transport</td>
<td>3</td>
<td>Vortisch</td>
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<tr>
<td>T-BGU-100014</td>
<td>Seminar in Transportation</td>
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<td>Chlond, Vortisch</td>
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<td>T-WIWI-103174</td>
<td>Seminar Mobility Services (Master)</td>
<td>3</td>
<td>Satzger, Stryja</td>
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<tr>
<td>T-BGU-103425</td>
<td>Mobility Services and new Forms of Mobility</td>
<td>3</td>
<td>Kagerbauer</td>
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<tr>
<td>T-BGU-103426</td>
<td>Strategic Transport Planning</td>
<td>3</td>
<td>Waßmuth</td>
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<tr>
<td>T-BGU-106608</td>
<td>Information Management for public Mobility Services</td>
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<td>Vortisch</td>
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</tbody>
</table>

Competence Goal
See German version.

Prerequisites
None

Recommendation
None
Module: Urban Water Technologies [M-BGU-104448]

**Responsible:** Dr.-Ing. Stephan Fuchs

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** Engineering Sciences (Usage from 10/1/2018)
Compulsory Elective Modules (Ingenieurwissenschaften) (Usage from 10/1/2018)

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**Mandatory**

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<th>Course Title</th>
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<th>Instructor(s)</th>
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<td>T-BGU-106600</td>
<td>Urban Water Infrastructure and Management</td>
<td>6 CR</td>
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<tr>
<td>T-BGU-109051</td>
<td>Wastewater and Storm Water Treatment Facilities for Industrial Engineers</td>
<td>3 CR</td>
<td>Fuchs, Morck</td>
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</table>

**Prerequisites**
None

**Recommendation**
None
Module: Vehicle Development [M-MACH-101265]

**Responsible:** Prof. Dr. Frank Gauterin

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- Engineering Sciences
- Compulsory Elective Modules (Ingenieurwissenschaften)

### Election block: Fahrzeugentwicklung (at least 9 credits)

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<th>Credits</th>
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<th>Language</th>
<th>Level</th>
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<td>Once</td>
<td>1 semester</td>
<td>Deutsch/Englisch</td>
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<th>Course Title</th>
<th>Credits</th>
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<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I</td>
<td>3 CR</td>
<td>Ammon</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I</td>
<td>1.5 CR</td>
<td>Zürn</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II</td>
<td>1.5 CR</td>
<td>Zürn</td>
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<tr>
<td>T-MACH-102207</td>
<td>Tires and Wheel Development for Passenger Cars</td>
<td>3 CR</td>
<td>Frech</td>
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<tr>
<td>T-MACH-105162</td>
<td>Fundamentals of Automobile Development I</td>
<td>1.5 CR</td>
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<tr>
<td>T-MACH-105163</td>
<td>Fundamentals of Automobile Development II</td>
<td>1.5 CR</td>
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<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering</td>
<td>4.5 CR</td>
<td>Frey, Gauterin, Gießler</td>
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<tr>
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<td>4 CR</td>
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<td>T-MACH-108888</td>
<td>Simulation of Coupled Systems - Advance</td>
<td>0 CR</td>
<td>Geimer, Xiang</td>
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### 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 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 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.
Module: Virtual Engineering A [M-MACH-101283]

**Responsible:** Prof. Dr.-Ing. Jivka Ovtcharova

**Organisation:** KIT Department of Mechanical Engineering

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

<table>
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<tr>
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<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>2 semester</td>
<td>Deutsch</td>
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</table>

**Mandatory**

- **T-MACH-102123 Virtual Engineering I** 4 CR Ovtcharova

**Elective block: Virtual Engineering A (at least 5 credits)**

- **T-MACH-109933 Business Administration for Engineers and IT professionals** 4 CR Maier
- **T-MACH-102185 CATIA CAD Training Course** 2 CR Ovtcharova
- **T-MACH-105312 CATIA Advanced** 4 CR Ovtcharova
- **T-MACH-108491 Digitalization of Products, Services & Production** 4 CR
- **T-MACH-102209 Information Engineering** 3 CR Ovtcharova
- **T-MACH-106743 IoT platform for engineering** 4 CR Ovtcharova
- **T-MACH-102153 PLM-CAD Workshop** 4 CR Ovtcharova
- **T-MACH-102181 PLM for Product Development in Mechatronics** 4 CR Eigner
- **T-MACH-106740 Virtual Engineering Lab** 4 CR Ovtcharova
- **T-MACH-106741 Virtual training factory 4.X** 4 CR Ovtcharova

**Competence Certificate**

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

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

**Competence Goal**

The students should:

- have basic knowledge about the industrial application of Information Technology in product development,
- have understanding about current and future application of information systems in product development processes in the context of Product Lifecycle Management and Virtual Engineering,
- be able to operate current CAx- and PLM-systems in the product development process
- understands demands and relevance of interconnected IT-systems and respective methods for product development

**Prerequisites**

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

**Content**

The Module Virtual Engineering A gives an overview about product development processes, beginning with requirement engineering, verification of manufacturing feasibility and virtual operation in the scope of Digital Factory. The guest-lectures contained in this module complete the content of the lecture with introducing current product development processes focusing.
Workload
Workload at 9 graduate credits / credit points: ca. 270 hours.

- regular attendance: 100 hours
- Preparation and reworking: 50 hours
- Exam and exam revision/preparation: 120 hours

Detailed apportionment results from credit points of the courses of the module

Learning type
Lecture, exercise
### 6.113 Module: Virtual Engineering B [M-MACH-101281]

**Responsible:** Prof. Dr.-Ing. Jivka Ovtcharova  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** Engineering Sciences  
**Compulsory Elective Modules (Ingenieurwissenschaften)**

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#### Election block: Virtual Engineering B (at least 5 credits)

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<td>4 CR</td>
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<td>T-MACH-102185</td>
<td>CATIA CAD Training Course</td>
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<td>CATIA Advanced</td>
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<td>T-MACH-108491</td>
<td>Digitalization of Products, Services &amp; Production</td>
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<td>Information Engineering</td>
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<td>T-MACH-106743</td>
<td>IoT platform for engineering</td>
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<td>T-MACH-102181</td>
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#### Competence Certificate

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

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

#### Competence Goal

The students should:

- have basic knowledge about industrial practice of Information Technology in the field of product development,
- have basic knowledge about innovative visualization techniques like Virtual Reality and feasible application of Virtual Mock-Ups (VMU) for validating product properties.
- is able to estimate potentials and risks of current Virtual Reality Systems in product development.
- understands demands and relevance of interconnected IT-systems and respective methods for product development.

#### Prerequisites

keine

#### Content

The module Virtual Engineering B communicates basics of Virtual Reality applications and their fields of application for validating product properties and for supporting product development processes.

Optional courses of this module complete the content with practical application of VR techniques in product development (Virtual Reality Exercise) and current product development processes.
Workload
Workload at 9 graduate credits / credit points: ca. 270 hours.

- regular attendance: 100 hours
- Preparation and reworking: 50 hours
- Exam and exam revision/preparation: 120 hours

Detailed apportionment results from credit points of the courses of the module

Learning type
Lecture, Exercise.
Module: Water Chemistry and Water Technology I [M-CIWVT-101121]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

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<td>Laboratory Work Water Chemistry</td>
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<td>Abbt-Braun, Horn</td>
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Competence Goal

The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water.

Prerequisites

none

Content

This module gives the basis to understand the most important methods of raw water treatment. Therefore types and sum of water constituents and their interaction with each other and with water molecules are introduced. The effects of the different treatment and purification methods are shown.
M 6.115 Module: Water Chemistry and Water Technology II [M-CIWVT-101122]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Ingenieurwissenschaften)

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Mandatory

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<td>Water Chemistry and Water Technology II</td>
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Competence Goal
The student

- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water,
- knows about the different types of water treatment and water purification methods to convert, reduce or concentrate water constituents,

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

Content
The effects of the different treatment and purification methods are shown and it is explained how they can convert, reduce or concentrate water constituents.
7.1 Course: Wildcard Key Competences Seminar 2 [T-WIWI-104681]

**Organisation:** University

**Part of:** M-WIWI-101808 - Seminarmodul

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</table>
7.2 Course: A closer look at Social Innovation [T-WIWI-109932]

**Responsible:** Dr. Daniela Beyer  
Prof. Dr. Marion Weissenberger-Eibl

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101507 - Innovationsmanagement

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

**Prerequisites**  
None

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

7.3 Course: Advanced Game Theory [T-WIWI-102861]

Responsible:
Prof. Dr. Karl-Martin Ehrhart
Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation:
KIT Department of Economics and Management

Part of:
M-WIWI-101453 - Angewandte strategische Entscheidungen
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

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<td>Practice (Ü)</td>
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Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Basic knowledge of mathematics and statistics is assumed.

Below you will find excerpts from events regarding this course:

Advanced Game Theory
2521533, WS 18/19, 2 SWS, Open in study portal

Learning Content
This course offers an advanced and rigorous treatment of game theory.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.
### 7.4 Course: Advanced Lab Informatics [T-WIWI-103523]

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

**Organisation:**  
KIT Department of Economics and Management

**Part of:**  
M-WIWI-101472 - Informatik  
M-WIWI-101628 - Vertiefung Informatik  
M-WIWI-101630 - Wahlpflicht Informatik

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<td>WS 18/19</td>
<td>2512300</td>
<td>Knowledge Discovery and Data Mining</td>
<td>Practical course (P)</td>
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<td>Each term</td>
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<td>2512300</td>
<td>Praktikum Entwicklung Soziotechnischer Informationssysteme</td>
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<td>Projektkurs: Betriebliche Informationssystem: Realisierung innovativer Dienste für Studierende</td>
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<td>Data Science &amp; Real-time Big Data Analytics</td>
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7 COURSES

Competence Certificate
Advanced Lab: "Privacy Friendly Apps":
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of a practical work in which a software functionality must be implemented and three interim submissions of the software to be developed. The weighting of the individual components will be announced during the first meeting.

All other courses of the Institute AIFB:
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) 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 regarding this course:

Security
2512100, WS 18/19, 4 SWS, Open in study portal

Notes

Linked Data and the Semantic Web
2512301, WS 18/19, 3 SWS, Open in study portal

Description
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'.

Notes
The exact dates and information for registration will be announced at the event page.

Workload
Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media
Real-World Challenges in Data Science and Analytics

2512311, WS 18/19, 3 SWS, Open in study portal

Notes
The exact dates and information for registration will be announced at the event page.

Cooperation seminar: Innovative applications on single board computers as well as their economic relevance

2512312, WS 18/19, 3 SWS, Open in study portal

Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic function opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

Entwicklung Soziotechnischer Informationssysteme

2512400, WS 18/19, SWS, Open in study portal

Description
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Workload
4 ECTS = approx. 120 h
Projektpraktikum Information Service Engineering
2512600, WS 18/19, 2 SWS, Open in study portal

Description
The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff. In the winter semester 2018/19 we intend to participate in the "Coding Da Vinci" Initiative.

The ISEproject 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, Linked Data engineering, and Knowledge Mining. The solution of the given research problem requires the development of a software implementation.

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.

Knowledge Discovery and Data Mining
2512300, SS 2019, 3 SWS, Open in study portal

Description
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.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Domains of interest include, but are not limited to:
- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:
- Mitchell, T.; Machine Learning

Data Science & Real-time Big Data Analytics
2513306, SS 2019, 2 SWS, Open in study portal

Description
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.
7.5 Course: Advanced Lab Security [T-WIWI-109786]

**Responsible:** Prof. Dr. Melanie Volkamer  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101472 - Informatik  
M-WIWI-101628 - Vertiefung Informatik  
M-WIWI-101630 - Wahlpflicht Informatik

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**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§4(2), 3 SPO 2015) 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 regarding this course:**

**Security**  
2512100, WS 18/19, 4 SWS, [Open in study portal](https://ilias.studium.kit.edu/goto.php?target=crs_719271&client_id=produktiv)

**Notes**

7 COURSES

Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

7.6 Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

**Responsible:** Prof. Dr. Melanie Volkamer  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik

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**Events**

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**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) 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 regarding this course:**

**Praktikum Security, Usability and Society**  
2512551, WS 18/19, 3 SWS, Open in study portal

**Notes**

Kick-off Meeting (compulsory attendance) 19.10.2018

**Responsible:** Prof. Dr. Melanie Volkamer

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) 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
7.8 Course: Advanced Machine Learning [T-WIWI-109921]

**Responsible:** Prof. Dr. Andreas Geyer-Schulz  
Dr. Abdolreza Nazemi

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101470 - Data Science: Advanced CRM

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<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Nazemi</td>
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**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 regarding this course:*

**Advanced Machine Learning**

2540535, SS 2019, 2 SWS, Open in study portal

**Learning Content**

**Tentative Course Outline:**

- Introduction
- Statistical Inference
- Shrinkage Methods
- Model Assessment and Selection
- Tree-based Machine Learning Algorithms
- Dimensionality Reduction
- Neural Networks and Deep Learning
- Natural Language Processing with Deep Learning
- Support Vector Machine

**Workload**

**Time of attendance**

- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
Literature

## 7.9 Course: Advanced Management Accounting [T-WIWI-102885]

### Responsible:
Prof. Dr. Marcus Wouters

### Organisation:
KIT Department of Economics and Management

### Part of:
M-WIWI-101510 - Cross-Functional Management Accounting

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<td>Lecture (V)</td>
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### Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

### Prerequisites
None.

### Recommendation
The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

### Annotation
This course is held in English. Lectures and tutorials are integrated.

The course is compulsory and must be examined.

Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

### Below you will find excerpts from events regarding this course:

#### Advanced Management Accounting

2579907, WS 18/19, 3 SWS, Open in study portal

### Learning Content
The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

### Annotation
This course is held in English. Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

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

### Literature
Literature is mostly made available via ILIAS.
7.10 Course: Advanced Statistics [T-WIWI-103123]

**Responsible:** Prof. Dr. Oliver Grothe  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101637 - Analytics und Statistik

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<td>2550552</td>
<td>Statistik für Fortgeschrittene</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Grothe</td>
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<td>WS 18/19</td>
<td>2550553</td>
<td>Übung zu Statistik für Fortgeschrittene</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>Grothe, Kaplan, Coblenz</td>
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**Competence Certificate**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4). The exam is offered every semester. Re-examinations are offered only for repeaters.

**Prerequisites**  
None

**Annotation**  
New course starting winter term 2015/2016

**Below you will find excerpts from events regarding this course:**

**Statistik für Fortgeschrittene**  
2550552, WS 18/19, 2 SWS, Open in study portal

**Learning Content**
Basic principles  
Types of convergence and limit theorems  
Multivariate Distributions  
Copulas  
Simulation techniques, Bootstrap  
Statistical Estimation  
Statistical Testing  
Simulation studies

**Literature**
Comprehensive lecture notes
7.11 Course: Advanced Stochastic Optimization [T-WIWI-106548]

**Responsible:** Prof. Dr. Steffen Rebennack

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101473 - Mathematische Optimierung
- M-WIWI-103289 - Stochastische Optimierung

**Type**
Prüfungsleistung schriftlich

**Credits**
4,5

**Recurrence**
Irregular

**Version**
1

**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.
7 COURSES

Course: Advanced Topics in Economic Theory [T-WIWI-102609]

7.12 Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsible: Prof. Dr. Kay Mitusch

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101406 - Netzwerkökonomie
M-WIWI-101497 - Agglomeration und Innovation
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

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<td>SS 2019 2520528</td>
<td>Übung zu Advanced Topics in Economic Theory</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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Competence Certificate
The course T-WIWI-102609 "Advanced Topics in Economic Theory" restarts in summer term 2019.

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 regarding this course:

Advanced Topics in Economic Theory
2520527, SS 2019, 2 SWS, Open in study portal

Learning Content
The course deals with basic elements of modern economic theory. It is divided into two parts. The first part introduces the microeconomic foundations of general equilibrium à la Debreu ("The Theory of Value", 1959) and Hildenbrand/Kirman ("Equilibrium Analysis",1988). The second part deals with asymmetric information and introduces the basic techniques of contract theory.

The course is largely based on the textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

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

Literature
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.
7.13 Course: Airport Logistics [T-MACH-105175]

**Responsible:** André Richter

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101263 - Einführung in die Logistik
- M-MACH-101277 - Materialfluss in Logistiksystemen
- M-MACH-101278 - Materialfluss in vernetzten Logistiksystemen
- M-MACH-101280 - Logistik in Wertschöpfungsnetzwerken

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<td>Lecture (V)</td>
<td>Richter</td>
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**Competence Certificate**

The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**

none

Below you will find excerpts from events regarding this course:

**Airport logistics**

2117056, WS 18/19, 2 SWS, Open in study portal

**Description**

**Media:**

presentations

**Learning Content**

Introduction
airport installations
luggage transport
passenger transport
security on the airport
legal bases of the air traffic
freight on the airport

**Annotation**

Limited number of participants: allocation of places in sequence of application (first come first served)

Application via "ILIAS" mandatory

personal presence during lectures mandatory

**Workload**

regular attendance: 21 hours

self-study: 99 hours

**Literature**

### 7.14 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 - Verbrennungsmotoren II

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<td>2134150</td>
<td>Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines</td>
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#### Competence Certificate

Letter of attendance or oral exam (25 minutes, no auxillary means)

#### Prerequisites

none

Below you will find excerpts from events regarding this course:

### Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines

2134150, SS 2019, 2 SWS, [Open in study portal](#)

**Lecture (V)**

**Description**

**Media:**

Lecture with Powerpoint slides

**Learning Content**

The students get involved in the application of different measurement techniques in the field of exhaust gas and lubricating oil analysis. The functional principles of the systems as well as the application areas of the latter are discussed. In addition to a general overview of standard applications, current specific development and research activities are introduced.

**Workload**

regular attendance: 24 hrs  
self study: 96 hrs

**Literature**

The lecture documents are distributed during the courses.
7.15 Course: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

Responsible: Jürgen Pfeil
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101303 - Verbrennungsmotoren II

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Events

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<td>Analysis tools for combustion diagnostics</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Pfeil</td>
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Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events regarding this course:

Analysis tools for combustion diagnostics
2134134, SS 2019, 2 SWS, Open in study portal

Learning Content
energy balance at the engine
energy conversion in the combustion chamber
thermodynamics of the combustion process
flow velocities
flame propagation
special measurement techniques

Workload
regular attendance: 24 hours
self-study: 96 hours

Literature
Lecture notes available in the lectures
Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]

**Responsible:** Prof. Dr. Marion Weissenberger-Eibl

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101507 - Innovationsmanagement
- M-WIWI-101507 - Innovationsmanagement

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<td>Innovationsprozesse analysieren und evaluieren</td>
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**Competence Certificate**
Non exam assessment (following §4(2) 3 of the examination regulation).
Innovation plan (exposé) (20%), Guided interviews/ quantitative survey (20%), presentation of results (20%), seminar paper (about 5 pages per person) (40%).

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management [2545015] is recommended.
T 7.17 Course: Application of Social Science Methods (WiWi) [T-GEISTSOZ-109052]

**Responsible:** Prof. Dr. Gerd Nollmann

**Organisation:** KIT Department of Humanities and Social Sciences

**Part of:** M-GEISTSOZ-101169 - Soziologie

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**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-GEISTSOZ-104565 - Computer Aided Data Analysis must have been passed.
7.18 Course: Applied Econometrics [T-WIWI-103125]

**Responsible:**  Prof. Dr. Melanie Schienle

**Organisation:**  KIT Department of Economics and Management

**Part of:**  M-WIWI-101638 - Ökonometrie und Statistik I

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

**Prerequisites**
None

**Annotation**
The course is not offered regularly.

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik
M-WIWI-101628 - Vertiefung Informatik
M-WIWI-101630 - Wahlpflicht Informatik

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| Events |  |  |
|--------|  |  |
| SS 2019| 2511032 | Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services |
|        | 2 SWS | Lecture (V) | Sunyaev |
| SS 2019| 2511033 | Übungen zu Angewandte Informatik II – Internet Computing |
|        | 1 SWS | Practice (Ü) | Sunyaev |

Competence Certificate
The assessment consists of a written exam (120 min) according to Section 4(2), 1 of the examination regulation.
The successful completion of the compulsory exercises is prerequisite for the admission to the written exam.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
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

Recommendation
Knowledge of content of the modules Foundations in Informatics [IW1INF1] and Algorithms I [IW2INF2] is expected.

Below you will find excerpts from events regarding this course:

Learning 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

Workload
The total workload for this course is approximately 150 hours. For further information see German version.
**Literature**
Tba in the lecture.
7 Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

Responsible: Prof. Dr. Gerhard Satzger

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics

Type: Prüfungsleistung schriftlich
Credits: 4.5
Recurrence: Each winter term
Version: 1

Events

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

Prerequisites
None

Below you will find excerpts from events regarding this course:

Artificial Intelligence in Service Systems
2595650, WS 18/19, 2 SWS, Open in study portal

Learning Content
Artificial Intelligence and the application of machine learning is becoming more and more popular to solve relevant business challenges. However, it is not only important to be familiar with precise algorithms, but rather a general understanding of the necessary steps with a holistic view—from real-world challenge to successful deployment of an AI. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. We then take this knowledge to the more complex case of service systems with different entities (e.g. companies) who interact with each other and show possibilities on how to derive holistic insights. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.
7.21 Course: Asset Pricing [T-WIWI-102647]

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

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101482 - Finance 1
- M-WIWI-101483 - Finance 2
- M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

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<td>SS 2019 2530556 Übung zu Asset Pricing</td>
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**Competence Certificate**

The success control takes place in form of a written examination (75 min) during the semester break (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by 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 strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

Below you will find excerpts from events regarding this course:

**Asset Pricing**

2530555, SS 2019, 2 SWS, [Open in study portal]

**Description**

The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

**Learning Content**

This lecture deals with the valuation of risky cash flows. A stochastic discount model and a central equation will be introduced, which form the basis of nearly every valuation model in finance. That includes the valuation of stocks, bonds and derivatives. The first part of the lecture will present the theory, the second part covers empirical questions related to this approach.

**Workload**

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

Basic literature


Elective literature

7.22 Course: Auction Theory [T-WIWI-102613]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
           M-WIWI-101453 - Angewandte strategische Entscheidungen
           M-WIWI-101500 - Microeconomic Theory

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Events

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<td>WS 18/19 2520409 Übungen zu Auktionstheorie</td>
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Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins. The exam is offered each semester.

Prerequisites
None

Below you will find excerpts from events regarding this course:

Auktionstheorie

Learning Content
This course deals with the analysis and modeling of auction which are based on game theory. This also includes aspects of applying and designing auctions as well as experiences with auctions. Main topics are:

- Single- and multi-unit auctions
- Selling and procurement auctions
- Electronic auctions (e.g. eBay, C2C, B2B)
- Multi-attributive auctions.

Annotation
We suggest to attend either Game Theory I or Decision Theory beforehand.

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

Literature
- Ehrhart, K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999
### 7.23 Course: Automated Financial Advisory [T-WIWI-106495]

**Responsible:** Prof. Dr Maxim Ulrich  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103261 - Disruptive Finanz-technologische Innovationen

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**Events**

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<td>Automated Financial Advisory</td>
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<td>Ulrich</td>
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**Competence Certificate**
The grade consists of a written thesis and an oral presentation.

**Prerequisites**
There are two conditions for taking this course:

1. This course is only open for registered students of the module "Disruptive FinTech Innovations".
2. Registered students do also attend in the same semester the lecture "Engineering FinTech Solutions" and the programming internship "Computational FinTech with Python and C++".

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-WIWI-106193 - Engineering FinTech Solutions must have been started.
2. The course T-WIWI-106496 - Computational FinTech with Python and C++ must have been started.

**Below you will find excerpts from events regarding this course:**

**Learning Content**
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**
The total workload for this course is approximately 90 hours.

**Literature**
Literature will be distributed during the first lecture.

**Learning Content**
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**
The total workload for this course is approximately 90 hours.

**Literature**
Literature will be distributed during the first lecture.
7 Course: Automated Manufacturing Systems [T-MACH-102162]

**Responsible:** Prof. Dr.-Ing. Jürgen Fleischer

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101298 - Automatisierte Produktionsanlagen

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**Events**

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<td>Automated Manufacturing Systems</td>
<td>6 SWS</td>
<td>Lecture / Practice (VÜ)</td>
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</table>

**Competence Certificate**

Written exam (120 minutes)

**Prerequisites**

"T-MACH-108844 - Automatisierte Produktionsanlagen" must not be commenced.

Below you will find excerpts from events regarding this course:

**Automated Manufacturing Systems**

2150904, SS 2019, 6 SWS, Open in study portal

**Description**

Media:

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

**Learning Content**

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

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

An interdisciplinary view of these subareas enables Industry 4.0 solutions.

In the second part of the lecture, the basics are illustrated using implemented manufacturing processes for the production of automotive components (chassis and drive technology). The analysis of automated manufacturing systems for manufacturing of defined components is also included.

In the field of vehicle power train both, the automated manufacturing process for the production of the conventional internal-combustion engine and the automated manufacturing process for the production of the prospective electric power train (electric motor and battery) are considered. In the field of car body, the focus is on the analysis of the process chain for the automated manufacturing of conventional sheet metal body parts, as well as for automated manufacturing of body components made out of fiber-reinforced plastics.

Within tutorials, the contents from the lecture are advanced and applied to specific problems and tasks.

**Annotation**

None
Workload

**MACH:**
- regular attendance: 63 hours
- self-study: 177 hours

**WING/TVWL:**
- regular attendance: 63 hours
- self-study: 207 hours

Literature
- Lecture Notes
### 7.25 Course: Automation of Discrete Event and Hybrid Systems [T-ETIT-100981]

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

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<td>Automatisierung ereignisdiskreter und hybrider Systeme</td>
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<td>2 SWS</td>
<td>Lecture (V)</td>
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**Prerequisites**

none
7.26 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 - Fahrzeugtechnik

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<td>2113805</td>
<td>Automotive Engineering I</td>
<td>4</td>
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<td>Gauterin, Unrau</td>
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<td>WS 18/19</td>
<td>2113809</td>
<td>Automotive Engineering I</td>
<td>4</td>
<td>Lecture (V)</td>
<td>Gauterin, Gießler</td>
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</table>

**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.

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-MACH-102203 - Automotive Engineering I must not have been started.

Below you will find excerpts from events regarding this course:

**Automotive Engineering I**

2113805, WS 18/19, 4 SWS, Open in study portal

**Learning 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

**Workload**

regular attendance: 45 hours  
self-study: 195 hours
Literature

Notes
In English language.

Learning 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)

Workload
regular attendance: 45 hours
self-study: 195 hours

Literature
7.27 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 - Fahrzeugtechnik

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<td>SS 2019 2114835 Automotive Engineering II</td>
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<td>SS 2019 2114855 Automotive Engineering II</td>
<td>3</td>
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</table>

**Competence Certificate**

Written Examination

Duration: 90 minutes

Auxiliary means: none

**Prerequisites**

none

Below you will find excerpts from events regarding this course:

**Automotive Engineering II**  
2114835, SS 2019, 2 SWS, Open in study portal

**Learning 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

**Workload**

regular attendance: 22,5 hours  
self-study: 97,5 hours

**Literature**

Learning 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

Literature

Elective literature:

7.28 Course: Automotive Logistics [T-MACH-105165]

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

Part of:
- M-MACH-101263 - Einführung in die Logistik
- M-MACH-101277 - Materialfluss in Logistiksystemen
- M-MACH-101278 - Materialfluss in vernetzten Logistiksystemen
- M-MACH-101280 - Logistik in Wertschöpfungsnetzwerken
- M-MACH-101282 - Globale Produktion und Logistik

Type
- Prüfungsleistung schriftlich

Credits: 4

Recurrence: Each summer term

Version: 1

Events

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<td>SS 2019 2118085 Automotive Logistics 2 SWS Lecture (V) Furmans</td>
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</table>

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

Prerequisites
none

Below you will find excerpts from events regarding this course:

Automotive Logistics
2118085, SS 2019, 2 SWS, Open in study portal

Description
Media:
presentations, black board

Notes
The event will be offered for the last time in the summer semester 2019.

Learning Content
- Logistic questions within the automobile industry
- basic model of automobile production and distribution
- relation with the suppliers
- Disposition and physical execution
- Vehicle production in the interaction of shell, paint shop and assembly
- Sequence planning
- Assembly supply
- vehicle distribution and linkage with selling processes
- Physical execution, planning and control

Annotation
none

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
None.


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

**Responsible:** Gerd Gutekunst
Prof. Dr. Berthold Wigger

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101511 - Vertiefung Finanzwissenschaft

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<td>3 SWS</td>
<td>Lecture (V)</td>
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**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 collection of public revenues is assumed. Therefore it is recommended to attend the course “Öffentliche Einnahmen” beforehand.
7.30 Course: Basics of Technical Logistics [T-MACH-102163]

**Responsible:** Dr.-Ing. Martin Mittwollen
Jan Oellerich

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101263 - Einführung in die Logistik
- M-MACH-101279 - Technische Logistik

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<td>2117095</td>
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<td>Basics of Technical Logistics</td>
<td>4 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Mittwollen, Oellerich</td>
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</table>

**Competence Certificate**
The assessment consists of a written exam (60 min.).

**Prerequisites**
none

*Below you will find excerpts from events regarding this course:*

**Basics of Technical Logistics**
2117095, WS 18/19, 4 SWS, Open in study portal

**Description**
Media:
supplementary sheets, presentations, blackboard

**Notes**
lectures and practice; practice dates: look up ILIAS

**Learning 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

**Annotation**
Basics knowledge of technical mechanics is preconditioned

**Workload**
presence: 48h
rework: 132h
Literature
Recommendations during lessons
**7.31 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I [T-MACH-100966]**

**Responsible:** Prof. Dr. Andreas Guber  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101290 - BioMEMS

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<td>WS 18/19</td>
<td>2141864</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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**Competence Certificate**  
written exam (75 Min.)

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

**BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I**  
2141864, WS 18/19, 2 SWS, Open in study portal  
Lecture (V)

**Description**  
Media: Lecture script

**Learning Content**  
Introduction into various microtechnical manufacturing methods: LIGA, Micro milling, Silicon Micromachining, Laser Microstructuring, µEDM, Metal-Etching  
Biomaterials, Sterilisation.  
Examples of use in the life science sector: basic micro fluidic structures: micro channels, micro filters, micromixers, micropumps, microvalves, Micro and nanotiter plates, Microanalysis systems (µTAS), Lab-on-chip applications.

**Annotation**  
The exam is held during the semester break. The date will be announced at the beginning of the semester.

**Workload**  
Literature: 20 h  
Sessions: 21 h  
Preparation and Review: 50 h  
Exam preparation: 30 h

**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
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 - Mikrosystemtechnik
- M-MACH-101290 - BioMEMS

**Type:** Prüfungsleistung schriftlich

**Credits:** 3

**Recurrence:** Each summer term

**Version:** 2

**Events**

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<th>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II</th>
<th>2 SWS</th>
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**Competence Certificate**

Written exam (75 Min.)

**Prerequisites**

none

**Below you will find excerpts from events regarding this course:**

*BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II*  
2142883, SS 2019, 2 SWS, Open in study portal

**Description**

**Media:**

Lecture script

**Learning Content**

Examples of use in Life-Sciences and biomedicine: Microfluidic Systems:
- LabCD, Protein Crystallisation
- Microarrays
- 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

**Workload**

Literature: 20 h

Lessons: 21 h

Preparation and Review: 50 h

Exam preparation: 30 h
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
### 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 - Mikrosystemtechnik  
- M-MACH-101290 - BioMEMS

**Type**  
Prüfungsleistung schriftlich  
**Credits**  
3  
**Recurrence**  
Each summer term  
**Version**  
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### Events

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**Competence Certificate**  
Written exam (75 Min.)

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

### Description

**Media:**  
Lecture script

**Learning 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

### Workload

- Literature: 20 h  
- Lessons: 21 h  
- Preparation and Review: 50 h  
- Exam preparation: 30 h

### 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  
- Madou  
- Fundamentals of Microfabrication
Course: Bionics for Engineers and Natural Scientists [T-MACH-102172]

7.34 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 - Mikrosystemtechnik
- M-MACH-101290 - BioMEMS
- M-MACH-101294 - Nanotechnologie

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<td>2142140</td>
<td>Bionics for Engineers and Natural Scientists</td>
<td>2 SWS</td>
<td>Hölscher, Walheim, Greiner</td>
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</table>

Competence Certificate
written or oral exam

Prerequisites
none

Below you will find excerpts from events regarding this course:

Description
Media:
Slides of the lectures

Learning 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.

Workload
lectures 30 h
self study 30 h
preparation for examination 30 h

Literature
### 7.35 Course: Blockchains & Cryptofinance [T-WIWI-108880]

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

**Organisation:** KIT Department of Economics and Management

**Part of:**  
- M-WIWI-101409 - Electronic Markets  
- M-WIWI-101446 - Market Engineering  
- M-WIWI-101480 - Finance 3  
- M-WIWI-101483 - Finance 2  
- M-WIWI-101511 - Vertiefung Finanzwissenschaft

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<td>WS 18/19</td>
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<td>Blockchains &amp; Cryptofinance</td>
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<td>Lecture (V)</td>
<td>Schuster, Uhrig-Homburg</td>
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<td>WS 18/19</td>
<td>2530568</td>
<td>Übung zu Blockchains &amp; Cryptofinance</td>
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<td>Practice (Ü)</td>
<td>Müller</td>
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**Competence Certificate**
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations).

**Prerequisites**
None

**Recommendation**
None

**Annotation**

*Below you will find excerpts from events regarding this course:*

**Blockchains & Cryptofinance**  
2530567, WS 18/19, 2 SWS, [Open in study portal](#)

**Workload**
Gesamtaufwand bei 4,5 Leistungspunkten: ca. 135.0 Stunden

Präsenzzeit: 30 Stunden  
Vor – und Nachbereitung der LV: 45.0 Stunden  
Prüfung und Prüfungsvorbereitung: 60.0 Stunden
7.36 Course: Building Intelligent and Robo-Advised Portfolios [T-WIWI-106442]

**Responsible:** Prof. Dr Maxim Ulrich

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung

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**Competence Certificate**

No exam in winter semester 2018/2019.

The exam tests the material of the current semester and takes place during the lecture-free period. Students who don't pass the exam are allowed to re-take the exam.

Details of the grade formation will be announced at the beginning of the event.

**Prerequisites**

None.

**Recommendation**

Good skills in applied math modeling (differential equations).

**Annotation**

The course is not offered regularly.
7.37 Course: Building Laws [T-BGU-103429]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101884 - Lean Management im Bauwesen
- M-BGU-101888 - Projektmanagement im Bauwesen

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**Events**

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<th>Lecture (V)</th>
<th>Miernik, Kohlhammer</th>
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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7.38 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 - Fahrzeugtechnik  
M-MACH-101267 - Mobile Arbeitsmaschinen

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<th>Lecture (V)</th>
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**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.

**Modeled Conditions**  
The following conditions have to be fulfilled:

1. The course T-MACH-108889 - BUS-Controls - Advance 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:**


Below you will find excerpts from events regarding this course:
Learning 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)

Annotation
The course will be replenished by interesting lectures of professionals.

Workload

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

Literature

Elective literature:

7.39 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 - Fahrzeugtechnik

**Type** | **Credits** | **Recurrence** | **Version**
---|---|---|---
Studienleistung | 0 | Each summer term | 1

**Competence Certificate**
Creation of control program

**Prerequisites**
none
7.40 Course: Business Administration for Engineers and IT professionals [T-MACH-109933]

**Responsible:** Dipl.-Ing. Thomas Maier  
**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

| SS 2019 | 2122303 | Business Administration for Engineers and IT professionals | 2 SWS | Seminar (S) |

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

**Prerequisites**  
None

Below you will find excerpts from events regarding this course:

**Business Administration for Engineers and IT professionals**  
2122303, SS 2019, 2 SWS, Open in study portal  
Seminar (S)

**Notes**  
Number of participants limited to 30 people.
7.41 Course: Business Administration in Information Engineering and Management [T-WIWI-102886]

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

Type: Prüfungsleistung schriftlich
Credits: 5
Recurrence: Each summer term
Version: 1

Events

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

Below you will find excerpts from events regarding this course:

Learning Content
In this lecture, classical Business Administration is applied to businesses in an information- and communication-technological environment. The process to extract relevant data for decision making from operational accounting systems receives special attention. In order to do so, topics such as activity-based costing and transaction costs models are addressed. The automation of the decision making process in businesses by data bases is another focus of the module. To solve such issues within a company, relevant methods such as decision theory and game theory are lectured. Finally, complex business relevant questions in a dynamically changing environment are adressed by presenting models and methods from system dynamics.
Workload
The total workload for this course is approximately 150 hours (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: 40h 00m
- Preparation of the examination: 31h 00m

Sum: 150h 00m

Literature
7.42 Course: Business and IT Service Management [T-WIWI-102881]

**Responsible:** Prof. Dr. Gerhard Satzger  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101448 - Service Management  
- M-WIWI-102754 - Service Economics and Management

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<td>2595484</td>
<td>Business and IT Service Management</td>
<td>2 SWS</td>
<td>Lecture (V) Satzger</td>
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<td>Übungen zu Business and IT Service Management</td>
<td>1 SWS</td>
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</table>

**Competence Certificate**  
The assessment of this course is a written examination (60 min.) (following §4(2), 1 SPOs) and by submitting written papers as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Prerequisites**  
None

**Recommendation**  
None

*Below you will find excerpts from events regarding this course:*

**Business and IT Service Management**  
2595484, WS 18/19, 2 SWS, Open in study portal

**Learning Content**  
The rapid development of information and communication technology transforms many enterprises towards service-oriented structures, comprising new digital services, new business models and SOA-based process structures within larger service networks. Thus, strategic and operative management of service-oriented enterprises increasingly gains importance. In this course, we want to systematically acquire relevant know-how and apply this to real world examples. Focus will be placed on the interdependencies of business, IT aspects and concepts.

The course will be taught in English. It should provide ample opportunity for active participation of students. The course will integrate presentations of experts from business practice as well as a comprehensive case study ('en bloc' for 1-2 days) in which students will actively work on the strategic service-oriented shift of an enterprise.

**Annotation**  
The credits have been changed from 5 to 4,5.

**Workload**  
The total workload for this course is approximately 135 hours. For further information see German version.
Literature
Maister, David H., Managing The Professional Service Firm, 1997
Teboul, J., Service is Front Stage: Positioning services for value advantage, 2006
Grönroos, Service Management and Marketing, 2007
Cardoso et al. (Hrsg.) (2015), Fundamentals on Service Systems
Böhmann et al. (2014), Service Systems Engineering, Business & Information Systems Engineering, Vol. 6, No.2, 73-79
Schüritz et al., (2017): Datatization as the Next Frontier of Servitization, ICIS Proceedings
7.43 Course: Business Data Analytics: Application and Tools [T-WIWI-109863]

 Responsible: Prof. Dr. Christof Weinhardt
 Organisation: KIT Department of Economics and Management
 Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
 M-WIWI-103118 - Data Science: Data-Driven User Modeling

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<td>Weinhardt, Dann, Staudt</td>
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<td>SS 2019</td>
<td>1 SWS</td>
<td>Excercise Business Data Analytics: Application and Tools</td>
<td>Practice (Ü)</td>
<td>Haubner, Dann, Frankenhauser, Staudt</td>
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</table>

Competence Certificate
Assessment consists of a written exam of one hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

Students receive one aggregated grade consisting of a written exam (60%) and the Analytics Challenge (40%). The exam and the Analytics Challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Analytics challenge.

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-108438 - Applied Analytics with Open Source Tools must not have been started.

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

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

Below you will find excerpts from events regarding this course:

Description
The ongoing digitalization and digitization of businesses, industries and societies is generating vast amounts of data. Hence, researchers and businesses are facing increasing pressure to build capabilities to cope with the data and generate value from the contained but yet to be discovered knowledge, insights and information. Researchers and practitioners tackling this task are referred to as data scientists and need skills at the intersection of programming, statistics and development operations. This course provides a hands-on perspective on these fields.
Learning Content
The aim of this course is to introduce practical foundations, concepts, tools and current practice of Analytics from a data scientist's perspective. The lecture is complemented with an Analytics challenge that is based on real-world data from research projects. The students immediately apply their newly acquired knowledge and learn to use a range of open source tools to solve the challenge.

Content:
- Conceptual and theoretical Foundations
- Programming languages common in data science
- Data acquisition, pre-processing
- Basics of data organization and DevOps
- Tool chain selection and automation
- Open source analytics frameworks and data processing infrastructures
- Applied analytics challenge (based on a current research project or a cooperation with an industry partner)

Workload
The total workload for this course is approximately 135 hours.
7.44 Course: Business Data Strategy [T-WIWI-106187]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Events

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Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and an alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. The grade is determined by 2/3 through the written exam and by 1/3 through the alternative exam assessment (e.g., presentation).

Prerequisites
None

Recommendation
Students should be familiar with basic concepts of business organisations, information systems, and programming. However, all material will be introduced, so no formal pre-conditions are applied.

Annotation
Limited number of participants.

Below you will find excerpts from events regarding this course:

Learning Content
With new methods for capturing and using different types of data and industry’s recognition that society’s use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense-making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications.

Literature
- Fleckenstein & Fellows (2017) – Modern Data Strategy
- Leimeister (2015) – Einführung in die Wirtschaftsinformatik
- Urbach & Ahlemann (2016) – IT-Management im Zeitalter der Digitalisierung
### Responsible
Prof. Dr. Andreas Geyer-Schulz

### Organisation
KIT Department of Economics and Management

### Part of
- M-WIWI-101409 - Electronic Markets
- M-WIWI-101470 - Data Science: Advanced CRM

### Type
Prüfungsleistung schriftlich

### Credits
4,5

### Recurrence
Each winter term

### Version
1

## Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

## Prerequisites
None

## Recommendation
None

Below you will find excerpts from events regarding this course:

### Business Dynamics
2540531, WS 18/19, 2 SWS, Open in study portal

**Lecture (V)**

#### Learning Content
Corporate growth, the diffusion of new technologies, business processes, project management, product development, service quality management – all these are examples for application areas of business dynamics. They all are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics such systems can be modelled. Simulations of complex systems allow the analysis, the goal centered design, as well as the optimization of markets, business processes, policies, and organizations.

#### Annotation
The course is generally held as block course.

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

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

**Organisation:** KIT Department of Economics and Management

**Part of:**  
M-WIWI-101506 - Service Analytics  
M-WIWI-101510 - Cross-Functional Management Accounting  
M-WIWI-103117 - Data Science: Data-Driven Information Systems  
M-WIWI-104068 - Information Systems in Organizations

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**Competence Certificate**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

Students receive one aggregated grade consisting of a written exam (60%) and the Business Intelligence System challenge (40%). The exam and the Business Intelligence System challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Business Intelligence System challenge.

**Prerequisites**

None

**Recommendation**

Basic knowledge on database systems is helpful.

---

Below you will find excerpts from events regarding this course:

### Business Intelligence Systems

**Lecture (V)**  
2540422, WS 18/19, 2 + 1 SWS, [Open in study portal](#)

**Description**

In most modern enterprises, Business Intelligence Systems represent a core enabler of managerial decision making in that they are supplying up-to-date and accurate information about all relevant aspects of a company’s planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance.

The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of Business Intelligence Systems from a managerial and technical perspective. The lecture is complemented with a Business Intelligence System challenge, where students work with real-world data and enable system-based decision making using commercial Business Intelligence software packages.

**Learning Content**

- Conceptual Foundations
- Provisioning: ETL Process, Metadata, Data Warehouse & Data Marts and Big Data Technologies
- Consumption: Reporting, Dashboards and its relation to (Big Data) Analytics
- BI Strategy & Governance
- BI Implementation & Post-Implementation Management
- Business Intelligence System Challenge (in cooperation with industry partner)
Literature
Economist Intelligence Unit. 2015 “Big data evolution: Forging new corporate capabilities for the long term”
7.47 Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-102806 - Service Innovation, Design & Engineering

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Events

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<td>SS 2019</td>
<td>2540457</td>
<td>Übungen zu Geschäftsmodelle im Internet: Planung und Umsetzung</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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</table>

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015). 50% of the final grade is based on the written exam and 50% is based on assignments from the exercises. Successful completion of the exercises is a prerequisite for admission to the written exam. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events regarding this course:

Internet Business Models
2540456, SS 2019, 2 SWS, Open in study portal

Description
The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.

Learning Content
The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.
Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Will be announced within the course.
7.48 Course: Business Planning [T-WIWI-102865]

**Responsible:** Prof. Dr. Orestis Terzidis

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101488 - Entrepreneurship (EnTechnon)

**Type:** Prüfungsleistung anderer Art

**Credits:** 3

**Recurrence:** Each term

**Version:** 1

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<td>Wohlfel, Bauman, Terzidis</td>
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<tr>
<td>SS 2019 2545005</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Geschäftsplanung für Gründer (Track 1)</td>
<td>Terzidis, Tittel, Ntagiakou</td>
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</tbody>
</table>

**Competence Certificate**

**Prerequisites**
None

**Recommendation**
None

**Description**
This seminar introduces basic concepts of business planning for entrepreneurs to the participants. It focuses on practical concepts and hands-on-methods on how to turn business ideas into solid businesses (e.g. Business Modelling, Market Potential, Planning of Resources, and further more) and on the creation of a realistic and viable Business Plan (with or without Venture Capital).
### Course: Business Process Modelling [T-WIWI-102697]

**Responsible:** Prof. Dr. Andreas Oberweis

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

#### Events

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<th>Credits</th>
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<td>Lecture (V)</td>
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<td>Übung zu Modellierung von Geschäftsprozessen</td>
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**Competence Certificate**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**
None

Below you will find excerpts from events regarding this course:

### Business Process Modelling

2511210, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**
The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

**Workload**
- Lecture 30h
- Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

**Literature**

Further Literature will be given in the lecture.
Below you will find excerpts from events regarding this course:

**Business Strategies of Banks**

**Description**
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.

The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

**Learning Content**
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.

The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.
Literature
Elective literature:

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer
7.51 Course: Case Studies in Sales and Pricing [T-WIWI-102834]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management

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Events

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<td>1 SWS</td>
<td>Block (B)</td>
<td>Klarmann, Assistenten</td>
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</table>

Competence Certificate


Prerequisites

None

Recommendation

None

Annotation

Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.

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

Please note that only one of the 1.5-ECTS courses can be attended in this module.

Below you will find excerpts from events regarding this course:

Case Studies in Sales and Pricing

2572182, WS 18/19, 1 SWS, Open in study portal

Learning Content

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

Annotation

- The final presentations can be held in German or English.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the 1.5-ECTS courses can be chosen in the Sales Management Module.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

Workload

Total work load for 1.5 ECTS: ca. 45 hours

Literature

7.52 Course: Case Studies Seminar: Innovation Management [T-WIWI-102852]

**Responsible:** Prof. Dr. Marion Weissenberger-Eibl

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovationsmanagement
- M-WIWI-101507 - Innovationsmanagement

**Type:** Prüfungsleistung anderer Art

**Credits:** 3

**Recurrence:** Each winter term

**Version:** 1

**Events**

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<td>Case studies seminar: Innovation management</td>
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</table>

**Competence Certificate**


**Prerequisites**

None

**Recommendation**

Prior attendance of the course Innovation Management [2545015] is recommended.

*Below you will find excerpts from events regarding this course:*

**Case studies seminar: Innovation management**

*2545105, WS 18/19, 2 SWS, Open in study portal*

**Learning Content**

The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the automotive industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course.

A short introduction to presentation techniques is planned to help students prepare the seminar papers.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.
7.53 Course: CATIA Advanced [T-MACH-105312]

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

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

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<td>CATIA advanced</td>
<td>3 SWS</td>
<td>Project (PRO)</td>
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Competence Certificate
Assessment of another type. Design project and written documentation in team work and final presentation. Grading: Project work 3/5, documentation 1/5 and presentation 1/5.

Prerequisites
none

Below you will find excerpts from events regarding this course:

CATIA advanced
2123380, SS 2019, 3 SWS, Open in study portal

Project (PRO)

Learning Content
- Use of advanced CAD techniques and CATIA functionalities
- Management of data using the PLM system SmarTeam
- Design engineering with CAD
- Integration of partial solutions into the overall solution
- Ensuring the reusability of CAD models through parameterization and cataloging
- Validation, strength tests (FEM analysis)
- Kinematic simulation with the digital mockup (DMU Kinematics)
- Production with integrated CAM tool
- Animations
- Presentation of results at the end of the semester

Annotation
For the workshop compulsory attendance exists.

Workload
regular attendance: 21 hours, self-study: 35 hours
7 COURSES

Course: CATIA CAD Training Course [T-MACH-102185]

7.54 Course: CATIA CAD Training Course [T-MACH-102185]

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

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

- Type: Studienleistung praktisch
- Credits: 2
- Recurrence: Each term
- Version: 2

Events

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<td>CATIA CAD training course</td>
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<td>Each term</td>
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<td>CATIA CAD training course</td>
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<td>Each term</td>
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</table>

Competence Certificate
Practical examination on CAD computer, duration: 60 min.

Prerequisites
None

Recommendation
Dealing with technical drawings is required.

Annotation
For the practical course attendance is compulsory.

Below you will find excerpts from events regarding this course:

CATIA CAD training course
2123358, WS 18/19, 2 SWS, Open in study portal

Learning Content
The participant will learn the following knowledge:

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

Annotation
For the practical course attendance is compulsory.

Workload
Regular attendance: 35 hours,
self-study: 12 hours

Literature
practical course skript
Learning Content
The participant will learn the following knowledge:

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

Annotation
For the practical course attendance is compulsory.

Workload
Regular attendance: 35 hours,
self-study: 12 hours

Literature
practical course skript
7.55 Course: Ceramic Processing Technology [T-MACH-102182]

**Responsible:** Dr. Joachim Binder

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**

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<tbody>
<tr>
<td>SS 2019</td>
<td>Ceramics Processing</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Binder</td>
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</table>

**Competence Certificate**
The assessment consists of an oral exam (approx. 20 min) taking place at the agreed date.

Auxiliary means: none

The re-examination is offered upon agreement.

**Prerequisites**

none

**Below you will find excerpts from events regarding this course:**

**V Ceramics Processing**

2126730, SS 2019, 2 SWS, Open in study portal

**Learning Content**
The course imparts technological basics for processing of engineering ceramics. The course is arranged in the following units:

- Synthesis methods
- Powder conditioning and mixing methods
- Forming of ceramics
- Sintering
- Finishing processes
- Ceramic films and multi-layer systems
- Effects of processing on properties

**Workload**

regular attendance: 21 hours

self-study: 99 hours

**Literature**


7.56 Course: Challenges in Supply Chain Management [T-WIWI-102872]

**Responsible:** Esther Mohr

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-102805 - Service Operations
- M-WIWI-102808 - Digital Service Systems in Industry

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**Competence Certificate**
The assessment consists of a written paper and an oral exam of ca. 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

**Prerequisites**
None

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

**Annotation**
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events regarding this course:

**Challenges in Supply Chain Management**
2550494, SS 2019, 3 SWS, Open in study portal

**Learning Content**
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / "Internet of Everything in production", supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

**Annotation**
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

**Workload**
The total workload for this course is approximately 135.0 hours. For further information see German version.
Literature
To be defined depending on the topic.
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<td>2 SWS</td>
<td>Each summer term</td>
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</table>

| Prerequisites | None |
| Recommendation | None |
| Annotation    | None |
7.58 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 - Verbrennungsmotoren I

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Events

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<td>Combustion Engines I</td>
<td>4 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Koch</td>
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</table>

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

Prerequisites
none

Below you will find excerpts from events regarding this course:

Combustion Engines I
2133113, WS 18/19, 4 SWS, Open in study portal

Lecture / Practice (VÜ)

Learning Content
Introduction, History, Concepts
Working Principle and Thermodynamics
Characteristic Parameters
Air Path
Fuel Path
Energy Conversion
Fuels
Emissions
Exhaust Gas Aftertreatment

Workload
regular attendance: 32 hours
self-study: 88 hours
7.59 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 - Verbrennungsmotoren II

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**Events**

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<td>Lecture / Practice (VÜ)</td>
<td>Koch</td>
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**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 regarding this course:

**Learning Content**

- Emissions
- Fuels
- Drive Train Dynamics
- Engine Parts
- Boosting
- Alternative Powertrain Concepts
- Special Engine Concepts
- Power Transmission

**Workload**
regular attendance: 31.5 hours
self-study: 90 hours
7.60 Course: Communication Systems and Protocols [T-ETIT-101938]

**Responsible:** Prof. Dr.-Ing. Jürgen Becker

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:** M-MACH-101295 - Optoelektronik und Optische Kommunikationstechnik

**Events**

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<td>Übungen zu 2311616 Communication Systems and Protocols</td>
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<td>Practice (Ü)</td>
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**Prerequisites**

none
7.61 Course: Competition in Networks [T-WIWI-100005]

**Responsible:** Prof. Dr. Kay Mitusch
**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101406 - Netzwerkökonomie

**Type:** Prüfungsleistung schriftlich  
**Credits:** 4,5  
**Recurrence:** Each winter term  
**Version:** 2

### Events

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<td>Competition in Networks</td>
<td>2</td>
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<td>Practice (Ü)</td>
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### 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 regarding this course:**

**V Competition in Networks**  
2561204, WS 18/19, 2 SWS, [Open in study portal](#)

**Description**

Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture.

### Workload

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

### Literature

Will be announced in the lecture.
7.62 Course: Computational Economics [T-WIWI-102680]

**Responsible:** Dr. rer. nat. Pradyumn Kumar Shukla

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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**Events**

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<td>Lecture (V)</td>
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<td>2590459</td>
<td>Übungen zu Computational Economics</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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</table>

**Competence Certificate**

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The bonus only applies to the first and second exam of the semester in which it was obtained.

**Prerequisites**

None

**Annotation**

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

*Below you will find excerpts from events regarding this course:*

**Computational Economics**

2590458, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**

Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.
Literature


Elective literature:

7.63 Course: Computational FinTech with Python and C++ [T-WIWI-106496]

**Responsible:** Prof. Dr Maxim Ulrich

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103261 - Disruptive Finanz-technologische Innovationen

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</table>

**Competence Certificate**
The grade is based on a larger or several smaller programming exercises.

**Prerequisites**
There are two conditions for taking this course:

1. This course is only open for registered students of the module “Disruptive FinTech Innovations”.
2. Registered students do also attend in the same semester the lecture “Engineering FinTech Solutions” and the seminar “Automated Financial Advisory”.

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-WIWI-106193 - Engineering FinTech Solutions must have been started.
2. The course T-WIWI-106495 - Automated Financial Advisory must have been started.

**Below you will find excerpts from events regarding this course:**

**Computational FinTech with Python and C++**

**2500003, WS 18/19, 1,5 SWS, Open in study portal**

**Practical course (P)**

**Learning Content**
At the beginning of the semester, each student receives a personalized set of programming tasks.

**Workload**
Roughly 45 hours.

**Computational FinTech with Python and C++**

**2530373, SS 2019, 1 SWS, Open in study portal**

**Practical course (P)**

**Learning Content**
At the beginning of the semester, each student receives a personalized set of programming tasks.

**Workload**
Roughly 45 hours.
**7.64 Course: Computational Risk and Asset Management I [T-WIWI-107032]**

**Responsible:** Prof. Dr Maxim Ulrich

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung

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**Competence Certificate**

No exam in winter semester 2018/2019.

The grade consists of an exam and seven problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

**Prerequisites**

None.

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-WIWI-102878 - Computational Risk and Asset Management must not have been started.

**Recommendation**

None
### Course: Computational Risk and Asset Management II [T-WIWI-106494]  

**Responsible:** Prof. Dr Maxim Ulrich  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung

**Competence Certificate**  

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and 6 problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

**Prerequisites**  
None.

**Recommendation**  
It is recommend that students have studied the material of „Computational Risk and Asset Management I“.  

**Annotation**  
## 7.66 Course: Computer Aided Data Analysis [T-GEISTSOZ-104565]

**Responsible:** Prof. Dr. Gerd Nollmann  
**Organisation:** KIT Department of Humanities and Social Sciences  
**Part of:** M-GEISTSOZ-101169 - Soziologie

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<td><strong>Computergestützte Datenauswertung: Chatbots und Robo-Journalisten: Natural Language Processing mit Deep Learning</strong></td>
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</table>
7.67 Course: Computer Contract Law [T-INFO-102036]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101215 - Recht des Geistigen Eigentums

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**Events**

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<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Bartsch, Harnischmacher</th>
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</table>

**Below you will find excerpts from events regarding this course:**

**Computer Contract Law**

2411604, WS 18/19, 2 SWS, [Open in study portal](#)

**Description**

The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

**Learning Content**

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

**Literature**

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H.Beck, II. Aufl. 2002
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

**Elective Literature**

tba in the transparencies
7.68 Course: Constitution and Properties of Protective Coatings [T-MACH-105150]

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

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Competence Certificate**
oral examination (about 30 min)

no tools or reference materials

**Prerequisites**
none

*Below you will find excerpts from events regarding this course:*

### Constitution and Properties of Protective Coatings

#### Learning Content
introduction and overview

concepts of surface modification

coating concepts

coating materials

methods of surface modification

coating methods

characterization methods

state of the art of industrial coating of tools and components

new developments of coating technology

#### Workload
regular attendance: 22 hours  
self-study: 98 hours

#### Literature

Copies with figures and tables will be distributed
Course: Constitution and Properties of Wear resistant materials

Type: Prüfungsteilnahme mündlich
Credits: 4
Recurrence: Each summer term
Version: 2

Events

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<td>2194643</td>
<td>Constitution and Properties of Wear resistant materials</td>
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</tr>
</tbody>
</table>

Competence Certificate
oral examination (about 30 min)
no tools or reference materials

Prerequisites
none

Below you will find excerpts from events regarding this course:

Learning 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

Workload
regular attendance: 22 hours
self-study: 98 hours
Literature
Schedler, W.: Hartmetall für den Praktiker, VDI-Verlag, Düsseldorf, 1988
Schneider, J.: Schneidkeramik, Verlag moderne Industrie, Landsberg am Lech, 1995

Copies with figures and tables will be distributed
7.70 Course: Construction Equipment [T-BGU-101845]

**Responsible:** Prof. Dr.-Ing. Sascha Gentes

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101110 - Verfahrenstechnik im Baubetrieb

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<td>Lecture (V)</td>
<td>Gentes, Dörfler</td>
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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
Course: Control of Linear Multivariable Systems [T-ETIT-100666]

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

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Events

- **WS 18/19**
  - 2303177 Control of Linear Multivariable Systems
    - 3 SWS Lecture (V) Kluwe
  - 2303179 Übungen zu 2303177 Regelung linearer Mehrgrößensysteme
    - 1 SWS Practice (Ü) Köpf

Prerequisites
none
7 COURSES

Course: Control Technology [T-MACH-105185]

7.72 Course: Control Technology [T-MACH-105185]

Responsible: Christoph Gönnheimer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101284 - Vertiefung der Produktionstechnik

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Events

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Competence Certificate

Written Exam (60 min)

Prerequisites

none

Below you will find excerpts from events regarding this course:

Description

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

Learning 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

Annotation

None

Workload

regular attendance: 21 hours
self-study: 99 hours
### Competence Certificate

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester. Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

### Prerequisites

None

### Recommendation

It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

### Annotation

The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

_Below you will find excerpts from events regarding this course:_

| Konvexe Analysis | 2550120 | SS 2019 | SWS Lecture (V) Stein |

### Learning Content

Convex Analysis deals with properties of convex functions and convex sets, in particular with respect to the minimization of convex functions over convex sets. That the involved functions are not necessarily assumed to be differentiable allows a number a applications which are not covered by techniques from smooth optimization, e.g. approximation problems with respect to the Manhattan or maximum norms, classification problems or the theory of statistical estimates. The lecture develops along another, geometrically simple example, where a nonsmooth obstacle set is to be described by a single smooth convex constraint such that minimal and maximal distances to the obstacle can be computed. The lecture is structured as follows:

- Introductory examples and terminology
- Convex subdifferential, Lipschitz continuity and the safety margin
- Normal cones, error bounds and the maximal distance

### Literature

**Elective literature:**

# 7.74 Course: Conveying Technology and Logistics [T-MACH-102135]

**Responsible:** Prof. Dr.-Ing. Kai Furmans  
Paolo Pagani  

**Organisation:** KIT Department of Mechanical Engineering  

**Part of:** M-WIWI-101808 - Seminarmodul

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<th>Furmans, Pagani</th>
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</table>

**Competence Certificate**

alternative test achievement (graded):

- written elaboration (workload of at least 80 h)
- oral presentation (approx. 30 min)

**Prerequisites**

none
### 7.75 Course: Copyright [T-INFO-101308]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101215 - Recht des Geistigen Eigentums

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7 COURSES

Course: Corporate Compliance [T-INFO-101288]

7.76 Course: Corporate Compliance [T-INFO-101288]

**Responsible:** Prof. Dr. Thomas Dreier

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101242 - Governance, Risk & Compliance

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Course: Corporate Financial Policy [T-WIWI-102622]

- **Responsible:** Prof. Dr. Martin Ruckes
- **Organisation:** KIT Department of Economics and Management
- **Part of:**
  - M-WIWI-101453 - Angewandte strategische Entscheidungen
  - M-WIWI-101480 - Finance 3
  - M-WIWI-101483 - Finance 2
  - M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

**Events**

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**Type**
- Prüfungsleistung schriftlich

**Credits**
- 4,5

**Recurrence**
- Each summer term

**Version**
- 1

**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

**Annotation**

The course will not be offered in summer term 2019. However, the exam can be written on the regular date at the end of the semester.

**Below you will find excerpts from events regarding this course:**

**Corporate Finance Policy**

2530214, SS 2019, 2 SWS, [Open in study portal](#)

**Description**

The course deals with the theory of corporate finance. Students are told profound knowledge about appropriate financing of firms.

**Learning Content**

**Topics:**
- Corporate financing: Some stylized facts
- Financing capacity
- Determination of outside financing
- Liquidity management: Maturity choice
- Cash flows with hidden characteristics
- Cash flows and product markets: Strategic financial structure choice
- Investor activism
- Takeovers

**Workload**

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

**Literature**

**Elective Literature**


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7 COURSES

7.78 Course: Corporate Risk Management [T-WIWI-109050]

**Responsible:** Prof. Dr. Martin Ruckes

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2
- M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

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**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**
None

**Annotation**
The course is offered as a block course in the summer term.

Below you will find excerpts from events regarding this course:

**Corporate Risk Management**
2530218, SS 2019, SWS, Open in study portal

**Learning Content**
- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

**Workload**
The total workload of this course is approximately 135.0 hours. For further information, see German version.

**Literature**
Übung zu Corporate Risk Management
2530219, SS 2019, SWS, Open in study portal

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

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

Literature

Course: Country Manager Simulation [T-WIWI-106137]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management
M-WIWI-101490 - Marketing Management

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Competence Certificate
Alternative exam assessment (30 minutes presentation) according to § 4 paragraph 2 Nr. 3 of the examination regulation SPO 2015.

Annotation
The course language is English. In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
Please note that only one of the 1.5-ECTS courses can be chosen in this Module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

Below you will find excerpts from events regarding this course:

Country Manager Simulation

2572172, WS 18/19, SWS, Open in study portal

Learning Content
Understanding Culture
Understanding International Buyer Behavior
Market Entry Decisions
International Marketing and Sales Management (adaptation vs. differentiation)

Annotation
- The course language is English.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the following courses can be chosen in the Sales Management Module: Country Manager Simulation, Case Studies in Sales and Pricing or Preisverhandlungen und Verkaufspräsentationen.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

Workload
Total workload for 1.5 ECTS: ca. 45 hours

Literature
# 7.80 Course: Credit Risk [T-WIWI-102645]

**Responsible:** Prof. Dr. Marliese Uhrig-Homburg  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101480 - Finance 3  
- M-WIWI-101483 - Finance 2

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### Competence Certificate

The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date.

### Prerequisites

None

### Recommendation

See German version.

### Annotation

See German version.

Below you will find excerpts from events regarding this course:

### Credit Risk

2530565, WS 18/19, 3 SWS, [Open in study portal](#)

### Description

The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

### Learning Content

The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

### Workload

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


Elective literature:

7.81 Course: Critical Information Infrastructures [T-WIWI-109248]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management

Part of:
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

Events

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Competence Certificate
The alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- the preparation of a written elaboration as well as
- an oral examination as part of a presentation of the work.

Details of the grades will be announced at the beginning of the course.

Prerequisites
None.

Annotation

Below you will find excerpts from events regarding this course:

Critical Information Infrastructures
2511400, WS 18/19, 2 SWS, Open in study portal

Lecture (V)

Description
The lecture critical information infrastructures introduces students to the world of these complex sociotechnical systems that permeate societies on a global scale. Students will learn to handle the complexities involved in the design, development, operation and evaluation of critical information infrastructures. In the beginning of the lecture, critical information infrastructures will be introduced on a general level. The following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. For example, students will learn how to continuously monitor and audit critical information infrastructures to ensure reliability and security. Likewise, students will get to know how to deal with cascading failures in interconnected infrastructures.
# 7.82 Course: Current Issues in Innovation Management [T-WIWI-102873]

**Responsible:** Prof. Dr. Marion Weissenberger-Eibl  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101507 - Innovationsmanagement  
- M-WIWI-101507 - Innovationsmanagement

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

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
Please note that the seminars we offer vary from semester to semester. Information about the currently offered seminars can be found in the Wiwi-Portal and on the iTM Website.
7.83 Course: Current Issues in the Insurance Industry [T-WIWI-102637]

** Responsible:** Wolf-Rüdiger Heilmann

** Organisation:** KIT Department of Economics and Management

** Part of:** M-WIWI-101449 - Insurance Management II

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** Competence Certificate**
The exam is offered latest in summer term 2016.
The assessment consists of a 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

** Recommendation**
For the understanding of this course knowledge of Private and Social Insurance [2530050] is required.

** Annotation**
Block course. For organizational reasons, please register with the secretary of the chair: thomas.mueller3@kit.edu.
7.84 Course: Current Topics on BioMEMS [T-MACH-102176]

**Responsible:** Prof. Dr. Andreas Guber  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101290 - BioMEMS

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**Competence Certificate**
active participation and own presentation (30 Min.)

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

**Actual topics of BioMEMS**
2143873, WS 18/19, 2 SWS, Open in study portal

**Description**
**Media:**
Written preparations from the participants.

**Workload**
Active participation on the seminary and preparation of an own presentation of a topic in BioMEMS.
Lecture time: 21 h  
Preparation: 40 h  
Preparation of own preparation: 60 h

**Actual topics of BioMEMS**
2143873, SS 2019, 2 SWS, Open in study portal

**Description**
**Media:**
Written preparations from the participants.

**Workload**
Active participation on the seminary and preparation of an own presentation of a topic in BioMEMS.
Lecture time: 21 h  
Preparation: 40 h  
Preparation of own preparation: 60 h
Course: Data Mining and Applications [T-WIWI-103066]

**Responsible:** Rheza Nakhaeizadeh

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101638 - Ökonometrie und Statistik I  
M-WIWI-101639 - Ökonometrie und Statistik II

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**Events**

| SS 2019 | 2520375 | Data Mining and Applications | 2/4 SWS | Lecture (V) | Nakhaeizadeh |

**Competence Certificate**

- Conduction of a larger empirical study in groups
- Reporting of milestones
- Final presentation (app. 45 minutes)

**Prerequisites**

None

Below you will find excerpts from events regarding this course:

**Data Mining and Applications**

2520375, SS 2019, 2/4 SWS, Open in study portal

**Learning Content**

Part one: Data Mining

Why 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
The total workload for this course is approximately 135 hours. For further information see German version.

Literature

- 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
### 7.86 Course: Data Protection by Design [T-INFO-108405]

**Responsible:** PD Dr. Oliver Raabe  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101242 - Governance, Risk & Compliance

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7.87 Course: Data Protection Law [T-INFO-101303]

**Responsible:** Prof. Dr. Nikolaus Marsch

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101217 - Öffentliches Wirtschaftsrecht

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### 7.88 Course: Database Systems and XML [T-WIWI-102661]

**Responsible:** Prof. Dr. Andreas Oberweis  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik

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**Credits:** 5  
**Recurrence:** Each winter term  
**Version:** 1

#### Events

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**Competence Certificate**  
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**  
None

**Below you will find excerpts from events regarding this course:**

#### Database Systems and XML  
2511202, WS 18/19, 2 SWS, Open in study portal  
Lecture (V)

**Learning Content**  
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

**Workload**  
Lecture 30h  
Exercise 15h

- Preparation of lecture 30h  
- Preparation of exercises 30h  
- Exam preparation 44h  
- Exam 1h

**Total:** 150h

**Literature**

- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002  
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Further literature will be given individually.
7.89 Course: Derivatives [T-WIWI-102643]

**Responsible:** Prof. Dr. Marliese Uhrig-Homburg

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101482 - Finance 1
- M-WIWI-101483 - Finance 2

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**Competence Certificate**
See German version.

**Prerequisites**
None

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Derivatives**
2530550, SS 2019, 2 SWS, [Open in study portal]

**Lecture (V)**

**Description**
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

**Learning Content**
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

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

**Literature**

**Elective literature:**
### 7.90 Course: Design Basics in Highway Engineering [T-BGU-106613]

**Responsible:**  Prof. Dr.-Ing. Ralf Roos

**Organisation:**  KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**  M-BGU-100998 - Entwurf, Bau, Betrieb und Erhaltung von Straßen

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**Events**

| SS 2019 | 6200408 | Design Basics in Highway Engineering | 2 SWS | Lecture (V) | Roos, Zimmermann |

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
7.91 Course: Design Thinking [T-WIWI-102866]

**Responsible:** Prof. Dr. Orestis Terzidis

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovationsmanagement

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<td>Terzidis, Jochem, Lau</td>
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**Competence Certificate**
Alternative exam assessments (§4(2), 3 SPO).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The seminar content will be published on the website of the institute.
### 7.92 Course: Developing Business Models for the Semantic Web [T-WIWI-102851]

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

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<td>Each winter term</td>
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**Competence Certificate**  

**Prerequisites**  
None

**Recommendation**  
As a recommendation to attending the seminar, basic knowledge about semantic technologies and concepts should be available. This may be acquired by attending one of the following lectures – Wissensmanagement, Semantic Web Technologies 1, Semantic Web Technologies 2 or by studying related literature. Furthermore the topic entrepreneurship should be of interest.

---

Industrial Engineering and Management M.Sc.  
Module Handbook as of 04.03.2019
### 7 COURSES

#### 7.93 Course: Digital Health [T-WIWI-109246]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik

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**Events**  
| WS 18/19 | 2511402 | Digital Health | 2 SWS | Lecture (V) | Sunyaev, Kromat |

**Competence Certificate**  
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

**Prerequisites**  
None.

**Annotation**  

**Below you will find excerpts from events regarding this course:**

#### Digital Health

**2511402, WS 18/19, 2 SWS, Open in study portal**  
**Lecture (V)**

**Description**  
The lecture "Digital Health" has a twofold purpose: first, to introduce theoretical foundations of various topics in digital health (they include, for instance, eHealth, health information systems, ambient assisted living, and smart homes in health care); and second, to introduce current topics in research on digital health (this includes for example genomics, gamification in health care, mobile health, and information privacy) by presenting papers and research projects the research group is working on. Furthermore, a practice-oriented lecture will be held to combine theoretically learnt skills with practice.

**Workload**  
4 ECTS = approx. 120 h.
7.94 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsible: Anja Konhäuser
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management

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Events

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<td>WS 18/19 2572176</td>
<td>Digital Marketing and Sales in B2B</td>
<td>1 SWS</td>
<td>Konhäuser</td>
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</table>

Competence Certificate

Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

Prerequisites

None.

Annotation

Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed. For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu). Please note that only one of the 1.5-ECTS courses can be attended in this module.

Below you will find excerpts from events regarding this course:

Digital Marketing and Sales in B2B

2572176, WS 18/19, 1 SWS, Open in study portal

Learning Content

Learning Sessions:

The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing. Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g. product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:

After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

Workload

time of presentness = 15 hrs.
private study = 30 hrs.
Literature

-
7.95 Course: Digital Service Design [T-WIWI-105773]

**Responsible:** Prof. Dr. Alexander Mädche

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-102806 - Service Innovation, Design & Engineering
- M-WIWI-104080 - Designing Interactive Information Systems

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<tr>
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<td>2540420</td>
<td>Digital Service Design</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Mädche, Liu, Toreini</td>
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**Competence Certificate**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation. Students receive one aggregated grade consisting of a written exam (60%) and the Digital Service Design challenge (40%). The exam and the Digital Service Design challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Digital Service Design challenge.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

The course is held in English.

**Below you will find excerpts from events regarding this course:**

**Digital Service Design**

2540420, WS 18/19, 2 SWS, Open in study portal

**Description**

Designing services is different from designing products. In contrast to products being discrete and tangible objects, services are co-produced by people and only provide value when they are actually used. Digital services represent a specific category of services and specifically leverage and integrate information technology in the service delivery process.

The aim of this course is to introduce key concepts and theoretical foundations of digital service design. Furthermore, a management perspective looking at the entire service lifecycle, covering the organizational and team level as well as state-of-the-art digital service design processes (e.g. agile, lean, continuous delivery) is provided. Finally, an introduction of important digital service design practices and tools supporting user research, conceptualization & prototyping as well as evaluation is given.

The lecture is complemented with a Digital Service Design challenge, where students leverage practices and tools from the lecture to suggest improvements for an existing digital service. The challenge is carried out in cooperation with practice partners (e.g. Commerzbank).

**Learning Content**

- Definition and key concepts of digital service design and related terms
- Introduction to the business and design perspective of a service design project
- The digital service design process from strategy through planning and prototyping to launching the digital service.
- Practice-oriented capstone project focusing on the design of a real-world digital service
### Literature


Course: Digital Transformation and Business Models [T-WIWI-108875]

**Responsible:** Dr. Daniel Jeffrey Koch

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101507 - Innovationsmanagement

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

The final grade is composed 75% of the grade of the written paper and 25% of the presentation.

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management [2545015] is recommended.
7.97 Course: Digital Transformation of Organizations [T-WIWI-106201]

**Responsible:** Prof. Dr. Alexander Mädche

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-101448 - Service Management
- M-WIWI-102754 - Service Economics and Management
- M-WIWI-102808 - Digital Service Systems in Industry
- M-WIWI-104068 - Information Systems in Organizations

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**Events**

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<td>3 SWS</td>
<td>Lecture (V)</td>
<td>Each summer term</td>
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**Competence Certificate**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation. Students receive one aggregated grade consisting of a written exam (60%) and case study deliverable (40%). The exam and the case study need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the case study.

**Prerequisites**

None

**Annotation**

The course will be held in English.

Below you will find excerpts from events regarding this course:

**Digital Transformation and Organizations**

2540556, SS 2019, 3 SWS, Open in study portal

**Description**

During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, IT is considered as key enabler of operational excellence ranging from the enrichment of routine working tasks (e.g., enterprise resource planning systems) to e-enabled integration of entire business eco-systems (e.g., e-supply chains). Complementing this primarily company-internal perspective on IT, we have recently have seen a massive growth of digital extensions of existing products and services across all industries. The disruptive potential of IT has already transformed selected key industries, e.g. media or retail, and its impact is continuously growing in all areas of business and society.

Large-scale information systems (IS) in organizations strongly interplay with work practices of individual employees as well as organizational structures shaping and being shaped by individuals' behavior. Thus, successful implementation of IS requires dealing with transformation beyond technology. The ability to implement and use IS in a way supporting its overall value proposition has become a central success determinant. Accordingly, the course “Management of Information Systems” course is designed to provide a comprehensive insight into theoretical foundations, concepts, tools, and current practice of IS. The lecture is complemented with a case study. Students get the opportunity to analyze and propose solutions for a selected real-world IS implementation.
Learning Content

- Definition and key concepts of Information Systems
- Introduction of different types of application systems (organizational process & information-centric systems, customer-centric systems, supplier-centric systems and people-centric systems) and their characteristics
- The digital transformation process: The pre-implementation, implementation and post-implementation phase covering facets such as business/IT alignment, packaged software selection, IS implementation projects, as well as adoption & use of IS
- Practice-oriented case study focusing on real-world IS scenarios

Literature

7.98 Course: Digitalization of Products, Services & Production [T-MACH-108491]

Organisation: KIT Department of Mechanical Engineering

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

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Events

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Competence Certificate
Assessment of another type. Two presentations in team work and two written compositions. Grading: each composition 1/6 and each presentation 2/3.

Prerequisites
none

Below you will find excerpts from events regarding this course:

Digitalization of Products, Services & Production
2122310, WS 18/19, 2 SWS, Open in study portal

Learning Content
- Digitalization of products, services and production in the context of Industry 4.0.
- Key drivers for ongoing digitalization and their impact on future product development and manufacturing.
- Methods and procedures to design the according transformation process.
- Intensive group discussions of use-case scenarios using practical examples from the industry.

Digitalization of Products, Services & Production
2122310, SS 2019, 2 SWS, Open in study portal

Learning Content
- Digitalization of products, services and production in the context of Industry 4.0.
- Key drivers for ongoing digitalization and their impact on future product development and manufacturing.
- Methods and procedures to design the according transformation process.
- Intensive group discussions of use-case scenarios using practical examples from the industry.
7.99 Course: Disassembly Process Engineering [T-BGU-101850]

**Responsible:** Prof. Dr.-Ing. Sascha Gentes

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101110 - Verfahrenstechnik im Baubetrieb

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**Events**

| SS 2019 | 6243803 | Verfahrenstechniken der Demontage | 2 SWS | Lecture / Practice (VÜ) | Gentes |

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7 COURSES
Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

7.100 Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

**Responsible:** Prof. Dr. Stefan Nickel

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-102805 - Service Operations
- M-WIWI-102832 - Operations Research im Supply Chain Management

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**Events**

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**Competence Certificate**
The assessment consists of a written paper and an oral exam of about 30–40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

**Prerequisites**
None

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

**Annotation**
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The course is planned to be held every summer term.
The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events regarding this course:

**Ereignisdiskrete Simulation in Produktion und Logistik**
2550488, SS 2019, 3 SWS, Open in study portal

**Learning Content**
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

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

Besides knowledge of Operations Research students are assumed to be familiar with the following topics:

- Introduction in Statistics
- Programming basics (algorithms and data structures)
- Basic knowledge in production and logistics

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

7 COURSES

Course: Dynamic Macroeconomics [T-WIWI-109194]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation und Wachstum
M-WIWI-101496 - Wachstum und Agglomeration
M-WIWI-101497 - Agglomeration und Innovation

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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 regarding this course:

**Dynamic Macroeconomics**
2560402, WS 18/19, 2 SWS, Open in study portal

Description
The course Dynamic Macroeconomics addresses macroeconomic questions on an advanced level. The main focus of this course is on dynamic programming and its fundamental role in modern macroeconomics. After starting with the necessary mathematical tools, several applications in labor economics, economic growth, and asset pricing are introduced. The course pursues a hands-on approach so that students not only gain theoretical insights but also learn numerical tools to solve dynamic economic models using the modern programming language Python.

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature and lecture notes are provided during the course.
7.102 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

**Responsible:** PD Dr. Patrick Jochem

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101452 - Energiewirtschaft und Technologie

### Events

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<th>SS 2019</th>
<th>2581006</th>
<th>Efficient Energy Systems and Electric Mobility</th>
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<td>Lecture (V) Jochem, McKenna</td>
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**Type** | Prüfungsleistung schriftlich  
**Credits** | 3,5  
**Recurrence** | Each summer term  
**Version** | 1

### Competence Certificate

See German version.

### Prerequisites

None

### Recommendation

None

**Below you will find excerpts from events regarding this course:**

### Learning Content

This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

The energy efficiency part of the lecture provides an introduction to the concept of energy efficiency, the means of affecting it and the relevant framework conditions. Further insights into economy-wide measurements of energy efficiency, and associated difficulties, are given with recourse to several practical examples. The problems associated with market failures in this area are also highlighted, including the Rebound Effect. Finally and by way of an outlook, perspectives for energy efficiency in diverse economic sectors are examined.

The electric mobility part of the lecture examines all relevant issues associated with an increased penetration of electric vehicles including their technology, their impact on the electricity system (power plants and grid), their environmental impact as well as their optimal integration in the future private electricity demand (i.e. smart grids and V2G). Besides technical aspects the user acceptance and behavioral aspects are also discussed.

### Workload

The total workload for this course is approximately 105.0 hours. For further information see German version.

### Literature

Will be announced in the lecture.
### Course: eFinance: Information Systems for Securities Trading [T-WIWI-109941]

**Responsible:** Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101446 - Market Engineering
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

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<td>WS 18/19 2540455 Übungen zu eFinance: Wirtschaftsinformatik für den Wertpapierhandel</td>
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**Competence Certificate**
The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4(2), 3 SPO 2007 respectively §4(3) SPO 2015). 70% of the final grade is based on the written exam and 30% is based on assignments from the exercises. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

**Prerequisites**
see below

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-WIWI-102600 - eFinance: Information Engineering and Management for Securities Trading must not have been started.

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Description**
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.
Learning Content
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market microstructure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

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

Literature

Elective literature:
7.104 Course: Elements and Systems of Technical Logistics [T-MACH-102159]

Responsible: Georg Fischer  
Dr.-Ing. Martin Mittwollen  

Organisation: KIT Department of Mechanical Engineering  

Part of: M-MACH-101263 - Einführung in die Logistik  
M-MACH-101279 - Technische Logistik

Type: Prüfungsleistung mündlich  
Credits: 4  
Recurrence: Each winter term  
Version: 1

Events

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<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
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Competence Certificate  
The assessment consists of an oral exam (20min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites  
none

Recommendation  
Knowledge out of Basics of Technical Logistics (T-MACH-102163) preconditioned

Below you will find excerpts from events regarding this course:

Elements and systems of Technical Logistics  
2117096, WS 18/19, 3 SWS, Open in study portal

Learning Content  
- material flow systems and their (conveying) technical components  
- mechanical behaviour of conveyors;  
- structure and function of conveyor machines; elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)  
- sample applications and calculations in addition to the lectures inside practical lectures

Annotation  
Knowledge out of Basics of Technical Logistics preconditioned

Workload  
presence: 36h  
rework: 84h

Literature  
recommendations during lectures
7.105 Course: Elements and Systems of Technical Logistics - Project [T-MACH-108946]

**Responsible:** Georg Fischer  
Dr.-Ing. Martin Mittwollen

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-MACH-101263 - Einführung in die Logistik  
M-MACH-101279 - Technische Logistik

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</table>

**Competence Certificate**

Presentation of performed project and defense (30min) according to §4 (2), No. 3 of the examination regulation

**Prerequisites**

T-MACH-102159 (Elements and Systems of Technical Logistics) must have been started

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-MACH-102159 - Elements and Systems of Technical Logistics must have been started.

**Recommendation**

Knowledge out of Basics of Technical Logistics (T-MACH-102163) preconditioned

Below you will find excerpts from events regarding this course:

**Description**

**Media:**

supplementary sheets, presentations, blackboard

**Learning Content**

- mechanical behaviour of conveyors;
- structure and function of conveyor machines;
- elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)
- sample applications and calculations in addition to the lectures inside practical lectures
- Self manufacturing of a project report to recesses the topic.

**Annotation**

Knowledge out of Basics of Technical Logistics (LV 2117095) preconditioned
### 7.106 Course: Emerging Trends in Critical Information Infrastructures [T-WIWI-109250]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
M-WIWI-101472 - Informatik  
M-WIWI-101628 - Vertiefung Informatik  
M-WIWI-101630 - Wahlpflicht Informatik

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**Competence Certificate**


**Prerequisites**

None.

**Annotation**

The course is usually held as a block course.

Below you will find excerpts from events regarding this course:

#### Emerging Trends in Critical Information Infrastructures

2513400, WS 18/19, 2 SWS, [Open in study portal](#)

**Description**

The block seminar Emerging Trends in Critical Information Infrastructures aims to provide insights into emerging topics in the field of information systems and to offer students an opportunity to write their first academic paper alone or in a group of students. Each semester, different topics are offered around the lectures and research domains of Prof. Sunyaev's chair, especially Trusted Engineering, Digital Health, Internet Technologies as well as Auditing and Certifications. Students can also submit their own topic suggestions within the framework of the main topics specified in the respective semester.
7.107 Course: Emissions into the Environment [T-WIWI-102634]

**Responsible:** Ute Karl

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101412 - Industrielle Produktion III
- M-WIWI-101471 - Industrielle Produktion II

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**Competence Certificate**
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Emissions into the Environment**

**Learning Content**
The course will provide an overview of sources of air pollution, waste and municipal waste; methods to monitor and to reduce/manage pollutant flows; regulatory framework on national and international level.

**A** Air pollution control
- Introduction and definitions
- Sources and pollutants
- Regulatory framework
- Emission monitoring
- Air pollution control measures

**B** Waste management and Recycling
- Introduction and regulatory framework
- Statistics and logistics
- Recycling and disposal
- Waste treatment

**C** Waste water treatment
- Municipal waste water treatment systems
- Sewage sludge disposal

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**
Will be announced in the course.
### Course: Employment Law I [T-INFO-101329]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101216 - Recht der Wirtschaftsunternehmen

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### 7.109 Course: Employment Law II [T-INFO-101330]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101216 - Recht der Wirtschaftsunternehmen

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7.110 Course: Energy and Environment [T-WIWI-102650]

**Responsible:** Ute Karl  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101452 - Energiewirtschaft und Technologie  
- M-WIWI-101468 - Umwelt- und Ressourcenökonomie

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**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 regarding this course:**

**Energy and Environment**  
2581003, SS 2019, 2 SWS, [Open in study portal](#)

**Learning Content**
The focus of the lecture is put on environmental impacts of fossil fuel conversion and related assessment methods. The list of topics is given below.

- Fundamentals of energy conversion  
- Air pollutant formation from fossil fuel combustion  
- Control of air pollutant emissions from fossil-fuelled power plants.  
- Measures to improve conversion efficiency of fossil fuelled power plants.  
- External effects of energy supply (Life Cycle Assessment of selected energy systems)  
- Integrated Assessment models supporting the European Thematic Strategy on Air  
- Cost-effectiveness analyses and cost-benefit analyses of air pollution control measures  
- Monetary evaluation of external effects of energy supply (external costs)

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

**Literature**
Thr references for further reading are included in the lecture documents (see ILIAS)
### 7.111 Course: Energy and Process Technology I [T-MACH-102211]

**Responsible:** Prof. Dr.-Ing. Hans-Jörg Bauer  
Dr.-Ing. Corina Schwitzke  
Dr. Amin Velji  
Heiner Wirbser  

**Organisation:** KIT Department of Mechanical Engineering

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**Part of:** M-MACH-101296 - Energie- und Prozesstechnik I

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

**Prerequisites**  
one

7.112 Course: Energy and Process Technology II [T-MACH-102212]

**Responsible:** Dr.-Ing. Corina Schwitzke  
Heiner Wirbser

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101297 - Energie- und Prozesstechnik II

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<td>6 SWS</td>
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<td>Schwitzke, Wirbser</td>
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**Competence Certificate**
The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
none

*Below you will find excerpts from events regarding this course:*

**Energy and Process Technology II**
2170832, SS 2019, 6 SWS, Open in study portal

**Learning Content**
**Thermal Turbomachinery** - In the first part of the lecture deals with energy systems. Questions regarding global energy resources and their use, especially for the generation and provision of electrical energy, are addressed. Common fossil and nuclear power plants for the centralized supply with electrical power as well as concepts of power-heat cogeneration for the decentralized electrical power supply by means of block-unit heat and power plants, etc. are discussed. Moreover, the characteristics and the potential of renewable energy conversion concepts, such as wind and hydro-power, photovoltaics, solar heat, geothermal energy and fuel cells are compare and evaluated. The focus is on the description of the potentials, the risks and the economic feasibility of the different strategies aimed to protect resources and reduce CO2 emissions.
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 - Verbrennungsmotoren I

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**Events**

| WS 18/19 | 2133121 | Energy Conversion and Increased Efficiency in Internal Combustion Engines | 2 SWS | Lecture (V) | Koch |

**Competence Certificate**  
oral exam, 25 minutes, no auxiliary means

**Prerequisites**  
one

Below you will find excerpts from events regarding this course:

**Learning 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. APR und DVA  
9. Combustion in Diesel engines  
10. Emissions  
11. Waste heat recovery  
12. Measures to increase efficiency

**Workload**

regular attendance: 24 hours, self-study: 96 hours
Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

**Responsible:** Dr.-Ing. Meike Braun  
Dr.-Ing. Frank Schönung

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-MACH-101263 - Einführung in die Logistik  
M-MACH-101279 - Technische Logistik

**Type**  
Prüfungsleistung mündlich

**Credits**  
4

**Recurrence**  
Each winter term

**Version**  
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<td>Lecture (V)</td>
<td>Braun, Schönung</td>
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**Competence Certificate**  
Oral, 30 min. examination dates after the end of each lesson period.

**Prerequisites**  
none

**Recommendation**  
The content of course “Basics of Technical Logistics” should be known.

**Annotation**  
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.

*Below you will find excerpts from events regarding this course:*

**Energy efficient intralogistic systems**  
2117500, WS 18/19, 2 SWS, [Open in study portal](#)

**Description**  
Media: presentations, black board

**Notes**  
The content of course “Basics of Technical Logistics” should be known.

**Learning Content**  
The main focuses of the course are:

- green supply chain
- processes in Intralogistic systems
- evaluation of energy consumption of conveyors
- modeling of conveying systems
- methods for energy savings
- approaches for energy efficiency increasing of continuous and discontinuous conveyors
- dimensioning energy efficient drives
- new approaches for resource efficient conveying systems.

**Annotation**  
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.
Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
None.
### 7.115 Course: Energy Market Engineering [T-WIWI-107501]

**Responsible:** Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101411 - Information Engineering
- M-WIWI-101446 - Market Engineering
- M-WIWI-101451 - Energiewirtschaft und Energiemärkte
- M-WIWI-103720 - eEnergy: Markets, Services and Systems

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#### Competence Certificate

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

#### Prerequisites

None

#### Recommendation

None

#### Annotation

Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".

The lecture has also been added in the IIP Module Basics of Liberalised Energy Markets.

Below you will find excerpts from events regarding this course:

### Energy Market Engineering

2540464, SS 2019, 2 SWS, Open in study portal

#### Learning Content

This lecture discusses different design options for electricity markets. We will focus on different approaches of nodal and zonal pricing as well as single price mechanisms and capacity markets. After a short recap of German and European market designs, the different design options will be discussed scientifically and with the help of examples. Furthermore, we will evaluate alternative market design options like microgrids. Besides the fundamental functioning of those markets, we will introduce and discuss methodological knowledge to evaluate market design options.

#### Annotation

The lecture has also been added in the IIP Module Basics of Liberalised Energy Markets.

#### Workload

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

T 7.116 Course: Energy Networks and Regulation [T-WIWI-107503]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

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Competence Certificate
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation. The exam is offered every semester. Re-examinations are offered on every ordinary examination date.

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

Below you will find excerpts from events regarding this course:

Energy Networks and Regulation
2540494, WS 18/19, 2 SWS, Open in study portal

Learning Content
The lecture “Energy Networks and Regulation” provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead (“Energiewende”, redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO.
- Objectives of regulation: Fair price calculation and high standard access conditions.
- The functioning of incentive regulation
- Amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.
Literature
### 7.117 Course: Energy Systems Analysis [T-WIWI-102830]

**Responsibility:** Dr. Armin Ardone

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101452 - Energiewirtschaft und Technologie

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**Competence Certificate**

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

**Prerequisites**

None

**Recommendation**

None

**Annotation**

Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

*Below you will find excerpts from events regarding this course:*

**Energy Systems Analysis**

2581002, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**

1. Overview and classification of energy systems modelling approaches
2. Usage of scenario techniques for energy systems analysis
3. Unit commitment of power plants
4. Interdependencies in energy economics
5. Scenario-based decision making in the energy sector
6. Visualisation and GIS techniques for decision support in the energy sector

**Annotation**

Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.
7 COURSES

7.118 Course: Energy Trade and Risk Management [T-WIWI-102691]

**Responsible:**
Dr. Clemens Cremer
Prof. Dr. Wolf Fichtner
Dr. Dogan Keles

**Organisation:**
KIT Department of Economics and Management

**Part of:**
M-WIWI-101451 - Energiewirtschaft und Energiemärkte

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<tr>
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**Events**

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<tr>
<td>SS 2019 2581020 Energy Trade and Risk Management</td>
<td>3 SWS</td>
<td>Lecture (V)</td>
<td>Keles, Cremer</td>
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</tbody>
</table>

**Competence Certificate**
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation.

**Prerequisites**
None

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Energy Trade and Risk Management**
2581020, SS 2019, 3 SWS, Open in study portal
Lecture (V)

**Learning Content**

1. Introduction to Markets, Mechanisms, Interactions
2. Basics of Risk Management
3. Oil Markets
4. Gas Markets
5. Coal Markets
6. Emission Markets
7. Simulation Game
8. Power Markets
9. Risk Management in Utilities

**Annotation**
The credits have been changed from 3.5 to 4.

**Workload**
The total workload for this course is approximately 120.0 hours. For further information see German version.
Literature
Elective literature:
www.riskglossary.com
7.119 Course: Engine Measurement Techniques [T-MACH-105169]

**Responsible:** Dr.-Ing. Sören Bernhardt  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101303 - Verbrennungsmotoren II

### Events

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**Type**  
Prüfungsleistung mündlich  
**Credits**  
4  
**Recurrence**  
Each summer term  
**Version**  
1

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<th>SS 2019</th>
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<th>Engine measurement techniques</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Bernhardt</th>
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</table>

**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 regarding this course:_

### Learning Content

Students get to know state-of-the-art measurement techniques for combustion engines. In particular basic techniques for measuring engine operating parameters such as torque, speed, power and temperature.

Possible measurement errors and aberrations are discussed.

Furthermore techniques for measuring exhaust emissions, air/fuel ratio, fuel consumption as well as pressure indication for thermodynamic analysis are covered.

**Workload**  
regular attendance: 21 hours  
self-study: 100 hours

**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
Course: Engineering FinTech Solutions [T-WIWI-106193]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung
M-WIWI-103261 - Disruptive Finanz-technologische Innovationen

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<td>2 SWS</td>
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<td>SS 2019</td>
<td>4</td>
<td>Lecture (V)</td>
<td>Engineering FinTech Solutions</td>
<td>3 SWS</td>
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</tbody>
</table>

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). Details of the grade formation will be announced at the beginning of the course.

Prerequisites
This course is only open for registered students of the module “Intelligent Risk and Investment Advisory” and “Disruptive FinTech Solutions”.

Recommendation
None

Annotation
The course will be held in English language.

Below you will find excerpts from events regarding this course:

Engineering FinTech Solutions
2530357, WS 18/19, 2 SWS, Open in study portal

Learning Content
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students.

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature will be distributed during the first lecture.

Engineering FinTech Solutions
2530357, SS 2019, 3 SWS, Open in study portal

Notes
New course starting summer term 2019.
Learning Content
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students.

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature will be distributed during the first lecture.
7.121 Course: Engineering Hydrology [T-BGU-108943]

Responsible: Dr.-Ing. Uwe Ehret

Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences

Part of:
- M-WIWI-101642 - Naturgefahren und Risikomanagement 1
- M-WIWI-101644 - Naturgefahren und Risikomanagement 2
- M-WIWI-104837 - Naturgefahren und Risikomanagement

Type: Prüfungsleistung schriftlich

Credits: 3

Recurrence: Each summer term

Version: 1

Events

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<th>6200617</th>
<th>Ingenieurhydrologie</th>
<th>2 SWS</th>
<th>Lecture / Practice (VÜ)</th>
<th>Ehret</th>
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</table>

Competence Certificate
See German version.

Prerequisites
None
7.122 Course: Enterprise Architecture Management [T-WIWI-102668]

Responsible: Thomas Wolf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik
M-WIWI-101628 - Vertiefung Informatik
M-WIWI-101630 - Wahlpflicht Informatik

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<td>2511600</td>
<td>Enterprise Architecture Management</td>
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<td>WS 18/19</td>
<td>2511601</td>
<td>Übungen zu Enterprise Architecture Management</td>
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</table>

Competence Certificate
The assessment of this course is a written (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Prerequisites
None

Below you will find excerpts from events regarding this course:

Enterprise Architecture Management
2511600, WS 18/19, 2 SWS, Open in study portal

Learning Content
The following topics will be covered: components of enterprise architecture, enterprise strategy including methods to develop strategies, business process (re)engineering, methods to implement changes within enterprises (management of change)

Literature

- Doppler, K., Lauterburg, Ch.: Change Management. Campus Verlag 1997
### 7.123 Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

**Responsible:** Dr. Carsten Linz  
Prof. Dr. Orestis Terzidis  

**Organisation:** KIT Department of Economics and Management  

**Part of:**  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101507 - Innovationsmanagement  

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<td>Each winter term</td>
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</table>

**Competence Certificate**  
Please note: The seminar cannot be offered in the winter semester 2018/2019 due to organizational reasons.  

**Prerequisites**  
None  

**Recommendation**  
None
### Course: Entrepreneurship [T-WIWI-102864]

**Responsible:** Prof. Dr. Orestis Terzidis  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101507 - Innovationsmanagement  

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**Events**

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<th>Entrepreneurship</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Terzidis, Mitarbeiter</th>
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</thead>
</table>

**Competence Certificate**  
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**  
None

**Recommendation**  
None

*Below you will find excerpts from events regarding this course:*

**Entrepreneurship**  
2545001, SS 2019, 2 SWS, [Open in study portal](#)

**Description**  
This lecture, as an obligatory part of the module “Entrepreneurship”, introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of business planning.  
Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

**Learning Content**  
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of financial planning.  
Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

**Workload**  
The total workload for this course is approximately 90 hours. For further information see German version.
### Competence Certificate
The performance review is done via a so-called other methods of performance review (term paper) (non-exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

### Prerequisites
None

### Recommendation
None

### Annotation
The topics will be prepared in groups. The presentation of the results is done during a week-long seminar at the end of the semester. Students have to be present all day long during the seminar.

**Below you will find excerpts from events regarding this course:**

### Learning Content
Content of the seminar is most recently discussed topics in the field of entrepreneurship. Topics and dates will be communicated online via the seminar portal.

### Annotation
The topics are prepared in small groups. The seminar consists of two attendance meetings (kick-off event and final presentation). Between the appointments, independent work is required. The results will be presented at the end of the semester. There is an obligation to attend all seminars.

### Workload
The total workload for this course is approximately 90 hours. For further information see German version.

### Literature
Will be announced during/prior to the seminar as this varies from topic to topic.
7.126 Course: Environmental and Resource Policy [T-WIWI-102616]

- **Responsible:** Rainer Walz
- **Organisation:** KIT Department of Economics and Management
- **Part of:** M-WIWI-101468 - Umwelt- und Ressourcenökonomie

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<td>Each summer term</td>
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</table>

**Competence Certificate**
See German version

**Recommendation**
It is recommended to already have knowledge in the area of industrial organization and economic policy. This knowledge may be acquired in the courses *Introduction to Industrial Organization* [2520371] and *Economic Policy* [2560280].
7.127 Course: Environmental Communication [T-BGU-101676]

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<td>4</td>
<td>Each term</td>
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**Responsible:** Dr. Charlotte Kämpf  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-WIWI-101642 - Naturgefahren und Risikomanagement 1  
- M-WIWI-101644 - Naturgefahren und Risikomanagement 2  
- M-WIWI-104837 - Naturgefahren und Risikomanagement

### Events

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<th>Code</th>
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<td>Umweltkommunikation (Environmental Communication)</td>
<td>Seminar (S)</td>
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**Competence Certificate**  
Non exam assessment (following §4(2), 3 of the examination regulation).

**Prerequisites**  
Examination Prerequisite Environmental Communication must be passend.

**Modeled Conditions**  
The following conditions have to be fulfilled:

1. The course T-BGU-106620 - Examination Prerequisite Environmental Communication must have been passed.

**Recommendation**  
None

**Annotation**  
one
**7.128 Course: Environmental Economics and Sustainability [T-WIWI-102615]**

**Responsible:** Rainer Walz

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101468 - Umwelt- und Ressourcenökonomie

**Type**
- Prüfungsleistung schriftlich

**Credits**
- 5

**Recurrence**
- Each winter term

**Version**
- 1

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<td>2 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Walz</td>
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</table>

**Competence Certificate**
See German version

**Prerequisites**
None

**Recommendation**
It is recommended to already have knowledge in the area of macro- and microeconomics. This knowledge may be acquired in the courses Economics I: Microeconomics [2600012] and Economics II: Macroeconomics [2600014].
### Course: Environmental Law [T-INFO-101348]

**Responsible:** Prof. Dr. Matthias Bäcker  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101217 - Öffentliches Wirtschaftsrecht  
- M-WIWI-101468 - Umwelt- und Ressourcenökonomie

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<tbody>
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</table>
Course: European and International Law [T-INFO-101312]

**Responsible:** Ulf Brühann

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101217 - Öffentliches Wirtschaftsrecht

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**Events**

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<th>24666</th>
<th>Europäisches und Internationales Recht</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Brühann</th>
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</table>

7.131 Course: Examination Prerequisite Environmental Communication [T-BGU-106620]

Responsible: Dr. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-101642 - Naturgefahren und Risikomanagement 1
M-WIWI-101644 - Naturgefahren und Risikomanagement 2
M-WIWI-104837 - Naturgefahren und Risikomanagement

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Events
- **WS 18/19**
  - Code: 6224905
  - Course: Umweltkommunikation / Environmental Communication
  - 2 SWS
  - Seminar (S)
  - Responsible: Kämpf

- **SS 2019**
  - Code: 6224905
  - Course: Umweltkommunikation (Environmental Communication)
  - 2 SWS
  - Seminar (S)
  - Responsible: Kämpf

Competence Certificate
2 literature annotations, appr. 150 words each, and short presentation, appr. 10 min.

Prerequisites
none

Recommendation
none

Annotation
none
7.132 Course: Exchanges [T-WIWI-102625]

**Responsible:** Dr. Jörg Franke

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

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<td>Each summer term</td>
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**Competence Certificate**
The examination will be offered latest until winter term 2018/2019 (repeaters only).

**Prerequisites**
None

**Recommendation**
None
7.133 Course: Exercises in Civil Law [T-INFO-102013]

**Responsible:** Prof. Dr. Thomas Dreier  
Dr. Yvonne Matz

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101191 - Wirtschaftsprivatrecht

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<th>Type</th>
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<td>Commercial and Corporate Law</td>
<td>Prüfungsleistung anderer Art</td>
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<td>Practice (Ü)</td>
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</table>

Wiele  
Matz  
Dreier  
Kleiner, Käde
Course: Experimental Economics [T-WIWI-102614]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of:
- M-WIWI-101446 - Market Engineering
- M-WIWI-101453 - Angewandte strategische Entscheidungen
- M-WIWI-101505 - Experimentelle Wirtschaftsforschung
- M-WIWI-103118 - Data Science: Data-Driven User Modeling

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<td>Prüfungsleistung</td>
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<td>Each winter term</td>
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</table>

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events regarding this course:

V Experimental Economics
2540489, WS 18/19, 2 SWS, Open in study portal

Learning Content
Experimental Economics have become a separate field in Economics. Nearly all fields of the economic discipline use economic experiments to verify theoretical results. Besides being used for empirical validation, this method is applied in political and strategic consulting. The lecture gives an introduction to experimental methods in economics and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

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

Literature
- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2nd ed., 2006.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.
### 7.135 Course: Experimental Lab Class in Welding Technology, in Groups [T-MACH-102099]

**Responsible:** Dr.-Ing. Stefan Dietrich  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**

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<td>WS 18/19</td>
<td>2173560</td>
<td>Welding Lab Course, in groupes</td>
<td>3 SWS</td>
<td>Practical course (P)</td>
<td>Dietrich, Schulze</td>
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</table>

**Competence Certificate**
Certificate to be issued after evaluation of the lab class report.

**Prerequisites**
Certificate of attendance for Welding technique (The participation in the course Welding Technology I/II is assumed.).

**Annotation**
The lab takes place at the beginning of the winter semester break once a year. The registration is possible during the lecture period in the secretariat of the Institute of Applied Materials (IAM – WK). The lab is carried out in the Handwerkskammer Karlsruhe.

You need sturdy shoes and long clothes!

**Below you will find excerpts from events regarding this course:**

#### Welding Lab Course, in groupes

**2173560, WS 18/19, 3 SWS, [Open in study portal](#)**

**Practical course (P)**

**Notes**
The lab takes place at the beginning of the winter semester break once a year. The registration is possible during the lecture period in the secretariat of the Institute of Applied Materials (IAM – WK). The lab is carried out in the Handwerkskammer Karlsruhe.

You need sturdy shoes and long clothes!

**Learning Content**
Gas welding of steels with different weld geometries

Gas welding of cast iron, nonferrous metals

Brazing of aluminum

Electric arc welding with different weld geometries

Gas welding according to the TIG, MIG and MAG procedures

**Annotation**
The lab takes place at the beginning of the winter semester break once a year. The registration is possible during the lecture period in the secretariat of the Institute of Applied Materials (IAM – WK). The lab is carried out in the Handwerkskammer Karlsruhe.

You need sturdy shoes and long clothes!
Workload
regular attendance: 31,5 hours
preparation: 8,5 hours
lab report: 80 hours

Literature
distributed during the lab attendance
### 7.136 Course: Extraordinary additional course in the module Cross-Functional Management Accounting [T-WIWI-108651]

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<tr>
<th>Responsible</th>
<th>Prof. Dr. Marcus Wouters</th>
</tr>
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<tr>
<td>Organisation</td>
<td>KIT Department of Economics and Management</td>
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**Competence Certificate**
The assessment depends on which extraordinary course becomes part of the module “Cross-Functional Management Accounting”.

**Prerequisites**
None

**Annotation**
The purpose of this placeholder is to make it possible to include an extraordinary course in the module “Cross-Functional Management Accounting”. Proposals for specific courses have to be approved in advance by the module coordinator.
Course: Fabrication Processes in Microsystem Technology [T-MACH-102166]

Responsible: Dr. Klaus Bade
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101291 - Mikrofertigung

<table>
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<td>Fabrication Processes in Microsystem Technology</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Bade</td>
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<tr>
<td>SS 2019</td>
<td>Fabrication Processes in Microsystem Technology</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Bade</td>
</tr>
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</table>

Competence Certificate
Oral examination, 20 minutes

Prerequisites
none

Below you will find excerpts from events regarding this course:

Fabrication Processes in Microsystem Technology
2143882, WS 18/19, 2 SWS, Open in study portal

Description

Media:
pdf files of presentation sheets

Learning Content
The lecture offers an advanced understanding of manufacturing processes in microsystem technology. Basic aspects of microtechnological processing will be introduced. With examples from semiconductor microfabrication and microsystem technology the base processing steps for conditioning and finishing, patterning, removal are imparted. Nano-patterning is covered is also included and the micro-nano interface is discussed. By the help of typical processing steps elementary mechanisms, process execution, and equipment are explained. Additionally quality control, process control and environmental topics are included

Literature
M. Madou
Fundamentals of Microfabrication
CRC Press, Boca Raton, 1997
W. Menz, J. Mohr, O. Paul
Mikrosystemtechnik für Ingenieure
Dritte Auflage, Wiley-VCH, Weinheim 2005
L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
Fabrication Processes in Microsystem Technology

2143882, SS 2019, 2 SWS, Open in study portal

Description

Media:

pdf files of presentation sheets

Learning Content

The lecture offers an advanced understanding of manufacturing processes in microsystem technology. Basic aspects of microtechnological processing will be introduced. With examples from semiconductor microfabrication and microsystem technology the base processing steps for conditioning and finishing, patterning, removal are imparted. Nano-patterning is covered is also included and the micro-nano interface is discussed. By the help of typical processing steps elementary mechanisms, process execution, and equipment are explained. Additionally quality control, process control and environmental topics are included

Literature

M. Madou
Fundamentals of Microfabrication
CRC Press, Boca Raton, 1997

W. Menz, J. Mohr, O. Paul
Mikrosystemtechnik für Ingenieure
Dritte Auflage, Wiley-VCH, Weinheim 2005

L.F. Thompson, C.G. Willson, A.J. Bowden
Introduction to Microlithography
## 7.138 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-102832 - Operations Research im Supply Chain Management

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### Events

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<tr>
<td>WS 18/19</td>
<td>2550486</td>
<td>Facility Location and Strategic Supply Chain Management</td>
<td>Lecture (V)</td>
<td>2 SWS</td>
<td>Nickel</td>
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<td>WS 18/19</td>
<td>2550487</td>
<td>Übungen zu Standortplanung und strategisches SCM</td>
<td>Practice (Ü)</td>
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### 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 (120 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 sucessful completion of the online assessments.

### Prerequisites
Prerequisite for admission to examination is the sucessful 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.

**Below you will find excerpts from events regarding this course:**

### Facility Location and Strategic Supply Chain Management

**Lecture (V)**  
2550486, WS 18/19, 2 SWS, Open in study portal

#### Learning Content
Since the classical work "Theory of the Location of Industries" of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.

Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

#### Annotation
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

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

Elective literature:

- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
7.139 Course: Failure of Structural Materials: Deformation and Fracture [T-MACH-102140]

**Responsible:** Prof. Dr. Peter Gumbsch  
Dr. Daniel Weygand  

**Organisation:** KIT Department of Mechanical Engineering  

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**

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<td>WS 18/19</td>
<td>2181711</td>
<td>Failure of structural materials: deformation and fracture</td>
<td>3</td>
<td>Lecture / Practice (VÜ)</td>
<td>Gumbsch, Weygand</td>
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</tbody>
</table>

**Competence Certificate**
oral exam ca. 30 minutes
no tools or reference materials

**Prerequisites**
none

**Recommendation**
preliminary knowledge in mathematics, mechanics and materials science

Below you will find excerpts from events regarding this course:

**Failure of structural materials: deformation and fracture**

2181711, WS 18/19, 3 SWS, Open in study portal  
Lecture / Practice (VÜ)

**Learning 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 elastic fracture mechanics  
   - crack resistance  
   - experimental measurement of fracture toughness  
   - defect measurement  
   - crack propagation  
   - application of fracture mechanics  
   - atomistics of fracture

**Workload**
regular attendance: 22,5 hours  
self-study: 97,5 hours
Literature

- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relatively simple but yet comprehensive overview of metallic materials
7.140 Course: Failure of Structural Materials: Fatigue and Creep [T-MACH-102139]

**Responsible:** Dr. Patric Gruber
                 Prof. Dr. Peter Gumbsch

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**

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<th>2181715</th>
<th>Failure of Structural Materials: Fatigue and Creep</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Gruber, Gumbsch</th>
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</table>

**Competence Certificate**
oral exam ca. 30 minutes
no tools or reference materials

**Prerequisites**
none

**Recommendation**
preliminary knowlege in mathematics, mechanics and materials science

Below you will find excerpts from events regarding this course:

**Failure of Structural Materials: Fatigue and Creep**

2181715, WS 18/19, 2 SWS, Open in study portal

**Learning Content**
1 Fatigue
   1.1 Introduction
   1.2 Statistical Aspects
   1.3 Lifetime
   1.4 Fatigue Mechanisms
   1.5 Material Selection
   1.6 Thermomechanical Loading
   1.7 Notches and Shape Optimization
   1.8 Case Study: ICE-Desaster

2 Creep
   2.1 Introduction
   2.2 High Temperature Plasticity
   2.3 Phänomenological DEscription of Creep
   2.4 Creep Mechanisms
   2.5 Alloying Effects

**Workload**
regular attendance: 22,5 hours
self-study: 97,5 hours
Literature

- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relatively simple but yet comprehensive overview of metallic materials
- Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); standard work on fatigue, all classes of materials, extensive, for beginners and advanced student
7.141 Course: Financial Analysis [T-WIWI-102900]

**Responsible:** Dr. Torsten Luedecke

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

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**Events**

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<td>2 SWS</td>
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<td>Luedecke</td>
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<td>SS 2019 2530206 Übungen zu Financial Analysis</td>
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<td>Practice (Ü)</td>
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**Competence Certificate**

See German version.

**Prerequisites**

None

**Recommendation**

Basic knowledge in corporate finance, accounting, and valuation is required.

Below you will find excerpts from events regarding this course:

**Financial Analysis**

2530205, SS 2019, 2 SWS, [Open in study portal](#)

**Description**

This lecture reviews the key financial statements according to international financial reporting standards and provides analytical tools to evaluate the income statement, the balance sheet, and the cash flow statement in order to measure a firm’s liquidity, operational efficiency, and profitability.

**Learning Content**

**Topics:**

- Introduction to Financial Analysis
- Financial Reporting Standards
- Major Financial Statements and Other Information
- Recognition and Measurement Issues
- Analysis of Financial Statements
- Financial Reporting Quality

**Literature**

7.142 Course: Financial Econometrics [T-WIWI-103064]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Ökonometrie und Statistik I
        M-WIWI-101639 - Ökonometrie und Statistik II

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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....
### 7.143 Course: Financial Intermediation [T-WIWI-102623]

**Responsible:** Prof. Dr. Martin Ruckes  
**Organisation:** KIT Department of Economics and Management

**Part of:**  
- M-WIWI-101453 - Angewandte strategische Entscheidungen  
- M-WIWI-101480 - Finance 3  
- M-WIWI-101483 - Finance 2  
- M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

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<td>Financial Intermediation</td>
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<td>WS 18/19</td>
<td>2530233</td>
<td>Übung zu Finanzintermediation</td>
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<td>Practice</td>
<td>Ruckes, Hoang, Benz</td>
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</table>

**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 regarding this course:

#### Financial Intermediation  
2530232, WS 18/19, 2 SWS, [Open in study portal](#)

**Description**

- Arguments for the existence of financial intermediaries  
- Bank loan analysis, relationship lending  
- Competition in the banking sector  
- Stability of the financial system  
- The macroeconomic role of financial intermediation

**Learning Content**

- Arguments for the existence of financial intermediaries  
- Bank loan analysis, relationship lending  
- Stability of the financial system  
- The macroeconomic role of financial intermediation  
- Principles of the prudential regulation of banks

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

**Literature**

**Elective literature:**

7.144 Course: Fixed Income Securities [T-WIWI-102644]

**Responsible:** Prof. Dr. Marliese Uhrig-Homburg

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

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<td>Each winter term</td>
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**Competence Certificate**

Please note that the lecture is not held in winter semester 18/19. The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO2015 and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date.

**Prerequisites**

None

**Recommendation**

Knowledge from the course "Derivatives" is very helpful.

**Annotation**

See German version.
7.145 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 - Fahrzeugtechnik  
M-MACH-101267 - Mobile Arbeitsmaschinen

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**Events**

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<tr>
<td>WS 18/19</td>
<td>Fluid Technology</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Geimer, Pult</td>
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</table>

**Competence Certificate**

The assessment consists of a written 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 regarding this course:

**Fluid Technology**  
2114093, WS 18/19, 2 SWS, Open in study portal

**Learning 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.

**Workload**

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

**Literature**

Scritum for the lecture *Fluidtechnik*  
Institute of Vehicle System Technology  
downloadable
7 COURSES
Course: Foundations of Information Systems [T-WIWI-109918]

7.146 Course: Foundations of Information Systems [T-WIWI-109918]

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

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101411 - Information Engineering

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<td>2540450</td>
<td>Foundations of Information Systems</td>
<td>2 SWS</td>
<td>Weinhardt, Mädche</td>
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<td>WS 18/19</td>
<td>2540451</td>
<td>Übungen zu &quot;Foundations of Information Systems&quot;</td>
<td>1 SWS</td>
<td>Jung, Mädche, Weinhardt</td>
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</table>

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

**Prerequisites**
None

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-WIWI-102638 - Principles of Information Engineering and Management must not have been started.

**Recommendation**
None

**Annotation**
This course replaces T-WIWI-102638 "Principles of Information Engineering and Management" as of summer semester 2019.

**Below you will find excerpts from events regarding this course:**

**V**

**Foundations of Information Systems**
2540450, WS 18/19, 2 SWS, Open in study portal

**Lecture (V)**

**Description**
Information plays a central role in today's society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the ‘information lifecycle’ that systematizes all phases from information generation to information distribution. The state of the art of economic theory is presented across this information lifecycle within the lectures.
The content of the lecture is deepened in accompanying lecture courses.
Learning Content
Information plays a central role in today's society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the “information lifecycle” that systematizes all phases from information generation to information distribution. The single phases of that cycle,

- extraction/generation,
- storage,
- transformation,
- evaluation,
- marketing
- and usage of information

are analyzed from the business administration perspective and the microeconomic perspective. The state of the art of economic theory is presented across this information lifecycle within the lectures. The content of the lecture is deepened in accompanying lecture courses.

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

Literature

7.147 Course: Foundry Technology [T-MACH-105157]

**Responsible:** Dr.-Ing. Christian Wilhelm  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**

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<td>2 SWS</td>
<td>Foundry Technology</td>
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**Competence Certificate**

oral exam; about 25 minutes

**Prerequisites**
None

**Recommendation**

It is strongly recommended to pass the two courses "Materials Science I" (T-MACH-102078) and "Materials Science II" (T-MACH-102079).

Below you will find excerpts from events regarding this course:

**Learning Content**

- Moulding and casting processes
- Solidifying of melts
- Castability
- Fe-Alloys
- Non-Fe-Alloys
- Moulding and additive materials
- Core production
- Sand reclamation
- Design in casting technology
- Casting simulation
- Foundry Processes

**Workload**

The workload for the lecture Foundry Technology is 120 h per semester and consists of the presence during the lecture (21 h) as well as preparation and rework time at home (99 h).

**Literature**

Reference to literature, documentation and partial lecture notes given in lecture.
### 7.148 Course: Freight Transport [T-BGU-106611]

**Responsible:** Bastian Chlond  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101064 - Grundlagen des Verkehrswesens  
- M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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<th>Lecture / Practice (VÜ)</th>
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**Competence Certificate**  
written exam, 60 min.

**Prerequisites**  
one

**Recommendation**  
one

**Annotation**  
one
7.149 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 - Verbrennungsmotoren II

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Events

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Competence Certificate

oral examination, Duration: ca. 25 min., no auxiliary means

Prerequisites

none

Below you will find excerpts from events regarding this course:

Fuels and Lubricants for Combustion Engines
2133108, WS 18/19, 2 SWS, Open in study portal

Learning Content

Introduction and basics

Fuels for Gasoline and Diesel engines

Hydrogen

Lubricants for Gasoline and Diesel engines

Coolants for combustion engines

Workload

regular attendance: 24 hours
self-study: 96 hours

Literature

Lecturer notes
7.150 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 - Fahrzeugtechnik

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**Type**
- Prüfungsleistung mündlich

**Credits**
- 1,5

**Recurrence**
- Each winter term

**Version**
- 1

**Competence Certificate**
- Oral group examination

- Duration: 30 minutes

- Auxiliary means: none

**Prerequisites**
- none

Below you will find excerpts from events regarding this course:

**Fundamentals for Design of Motor-Vehicles Bodies I**
- 2113814, WS 18/19, 1 SWS, Lecture (V)

**Learning 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

**Workload**
- regular attendance: 10,5 hours
- self-study: 49,5 hours

**Literature**
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg
7.151 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 - Fahrzeugtechnik

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<th>2114840</th>
<th>Fundamentals for Design of Motor-Vehicles Bodies II</th>
<th>1 SWS</th>
<th>Lecture (V)</th>
<th>Bardehle</th>
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**Competence Certificate**

Oral group examination

Duration: 30 minutes

Auxiliary means: none

**Prerequisites**

none

Below you will find excerpts from events regarding this course:

**Fundamentals for Design of Motor-Vehicles Bodies II**  
2114840, SS 2019, 1 SWS, Open in study portal

**Notes**

Scheduled dates:  
see homepage of the institute.  
Further information and possible changes of date: see homepage of the institute.

**Learning 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

**Workload**

regular attendance: 10,5 hours  
self-study: 49,5 hours
Literature
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg
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 - Fahrzeugentwicklung
- M-MACH-101267 - Mobile Arbeitsmaschinen

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**Events**

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<td>1 SWS</td>
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**Competence Certificate**

Oral group examination

Duration: 30 minutes

Auxiliary means: none

**Prerequisites**

none

*Below you will find excerpts from events regarding this course:*  

**Fundamentals in the Development of Commercial Vehicles I**  
2113812, WS 18/19, 1 SWS, [Open in study portal](#)

**Learning 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

**Workload**

regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**

7 COURSES

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 - Fahrzeugentwicklung
- M-MACH-101267 - Mobile Arbeitsmaschinen

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**Events**

| SS 2019 | 2114844 | Fundamentals in the Development of Commercial Vehicles II | 1 SWS | Lecture (V) | Zürn |

**Competence Certificate**

Oral group examination

Duration: 30 minutes

Auxiliary means: none

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

**Fundamentals in the Development of Commercial Vehicles II**

Learning 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

Workload
regular attendance: 10,5 hours
self-study: 49,5 hours

Literature


### 7.154 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 - Fahrzeugentwicklung

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**Events**

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<td>Fundamentals of Automobile Development I</td>
<td>1 SWS</td>
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<td>WS 18/19</td>
<td>2113851</td>
<td>Principles of Whole Vehicle Engineering I</td>
<td>1 SWS</td>
<td>Lecture (V)</td>
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**Competence Certificate**  
Written examination  
Duration: 90 minutes  
Auxiliary means: none

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

**Fundamentals of Automobile Development I**  
2113810, WS 18/19, 1 SWS, Open in study portal

**Notes**  
Block lecture on two days. Room and data will be published on the homepage of the institute.

**Learning Content**
1. Process of automobile development  
2. Conceptual dimensioning and design of an automobile  
3. Laws and regulations – National and international boundary conditions  
4. Aerodynamics dimensioning and design of an automobile  
5. Aerodynamics 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

**Workload**  
regular attendance: 10,5 hours  
self-study: 49,5 hours

**Literature**  
The script will be provided during the first lessons

**Principles of Whole Vehicle Engineering I**  
2113851, WS 18/19, Open in study portal
Notes
Block lecture on two days. Room and data will be published on the homepage of the institute.
In English language.

Learning 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

Workload
regular attendance: 10,5 hours
self-study: 49,5 hours

Literature
The scriptum will be provided during the first lessons
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 - Fahrzeugentwicklung

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<td>Development II</td>
<td>1 SWS</td>
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**Competence Certificate**  
Written examination  
Duration: 90 minutes  
Auxiliary means: none

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

**Fundamentals of Automobile Development II**  
2114842, SS 2019, 1 SWS, Open in study portal  

**Learning 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

**Workload**  
regular attendance: 10,5 hours  
self-study: 49,5 hours

**Literature**  
The scriptum will be provided during the first lessons.

**Principles of Whole Vehicle Engineering II**  
2114860, SS 2019, 1 SWS, Open in study portal
Learning 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

Workload
regular attendance: 10.5 hours
self-study: 49.5 hours

Literature
The scriptum will be provided during the first lessons.
7 COURSES

7.156 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsibility:
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 - Verbrennungsmotoren II

Type: Prüfungsleistung mündlich
Credits: 4
Recurrence: Each summer term
Version: 1

Events

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<td>2 SWS</td>
<td>Lox, Grunwaldt, Deutschmann</td>
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Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

Below you will find excerpts from events regarding this course:

Fundamentals of catalytic exhaust gas aftertreatment
2134138, SS 2019, 2 SWS, Open in study portal

Lecture (V)

Learning Content
1. kind and source of emissions
2. emission legislation
3. principal of catalytic exhaust gas aftertreatment (EGA)
4. EGA at stoichiometric gasoline engines
5. EGA at gasoline engines with lean mixtures
6. EGA at diesel engines
7. economical basic conditions for catalytic EGA

Workload
regular attendance: 36 hours
self-study: 84 hours

Literature
Lecture notes available in the lectures


Industrial Engineering and Management M.Sc.
Module Handbook as of 04.03.2019
7 COURSES

Course: Gas Engines [T-MACH-102197]

7.157 Course: Gas Engines [T-MACH-102197]

**Responsible:** Dr.-Ing. Rainer Golloch

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101303 - Verbrennungsmotoren II

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**Competence Certificate**
Oral examination, duration 25 min., no auxiliary means

**Prerequisites**
none
7.158 Course: Gear Cutting Technology [T-MACH-102148]

**Responsible:** Dr. Markus Klaiber  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101284 - Vertiefung der Produktionstechnik

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**Competence Certificate**  
Oral Exam (20 min)

**Prerequisites**  
none

*Below you will find excerpts from events regarding this course:*

**Gear Cutting Technology**  
2149655, WS 18/19, 2 SWS, Open in study portal

**Description**  
*Media:*  
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

**Learning 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.

**Workload**  
regular attendance: 21 hours  
self-study: 99 hours
### Course: Global Optimization I [T-WIWI-102726]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101473 - Mathematische Optimierung

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#### Events

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<td>2 SWS</td>
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<td>SS 2019 2550135</td>
<td>Übungen zu Globale Optimierung I+II</td>
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<td>Practice (Ü)</td>
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**Competence Certificate**

Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO) and possibly of a compulsory prerequisite.

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

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-WIWI-103638 - Global Optimization I and II must not have been started.

**Recommendation**

None

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events regarding this course:

**Globale Optimierung I**

2550134, SS 2019, 2 SWS, Open in study portal
Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
- W. Alt Numerische Verfahren der konvexen, nichtglatten Optimierung Teubner 2004
- C.A. Floudas Deterministic Global Optimization Kluwer 2000
- R. Horst, H. Tuy Global Optimization Springer 1996
7 COURSES

Course: Global Optimization I and II [T-WIWI-103638]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung

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Events

| SS 2019 | 2550134 | Globale Optimierung I | 2 SWS | Lecture (V) | Stein |
| SS 2019 | 2550136 | Globale Optimierung II | 2 SWS | Lecture (V) | Stein |

Competence Certificate

The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites

None

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-WIWI-102726 - Global Optimization I must not have been started.
2. The course T-WIWI-102727 - Global Optimization II must not have been started.

Recommendation

None

Annotation

Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events regarding this course:

Globale Optimierung I

2550134, SS 2019, 2 SWS, Open in study portal

Learning Content

In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.
Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996

Learning Content

In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture. Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
7 COURSES

Course: Global Optimization II [T-WIWI-102727]

**Responsible:** Prof. Dr. Oliver Stein

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101473 - Mathematische Optimierung

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**Events**

| SS 2019 | 2550135 | Übungen zu Globale Optimierung I+II | 1 SWS | Practice (Ü) | Stein, Neumann |
| SS 2019 | 2550136 | Globale Optimierung II | 2 SWS | Lecture (V) | Stein |

**Competence Certificate**

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

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

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-WIWI-103638 - Global Optimization I and II must not have been started.

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events regarding this course:

**Globale Optimierung II**

2550136, SS 2019, 2 SWS, Open in study portal

**Learning Content**

In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture.

Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.
Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
7.162 Course: Global Production and Logistics - Part 1: Global Production [T-MACH-105158]

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

Part of: M-MACH-101282 - Globale Produktion und Logistik

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Events

| WS 18/19 | 2149610 | Global Production and Logistics - Part 1: Global Production | 2 SWS | Lecture (V) | Lanza |

Competence Certificate

Written Exam (60 min)

Prerequisites

"T-MACH-108848 - Globale Produktion und Logistik - Teil 1: Globale Produktion" must not be commenced.

Below you will find excerpts from events regarding this course:

Global Production and Logistics - Part 1: Global Production

Lecture (V)  
2149610, WS 18/19, 2 SWS, Open in study portal

Description

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

Notes

Lectures on Mondays 14:00-15:30

Learning Content

Target of the lecture is to depict the challenges and fields of action of global operating companies and to give an overview of central aspects in global production networks as well as establishing a deepening knowledge of established methods and procedures for design and scale. Within the course methods for site selection, procedures for site specific adjustment of product construction and product technology as well as planning approaches to establish a new production site are imparted. The course is rounded off by showing the characteristics of the departments sale, procurement as well as research and development under global aspects. Moreover, the implementation of Industry 4.0 applications is discussed in the context of global production.

The topics are:

- Basic conditions and influencing factors of global production (historical development, targets, chances and threats)
- Global sales
- Site selection
- Site specific production adjustment
- Establishing of new production sites
- Global procurement
- Design and management of global production networks
- Global research and development

Annotation

None
Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
Lecture Notes
recommended secondary literature:
7.163 Course: Global Production and Logistics - Part 2: Global Logistics [T-MACH-105159]

**Responsible:** Prof. Dr.-Ing. Kai Furmans

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101282 - Globale Produktion und Logistik

### Events

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### Competence Certificate

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

### Prerequisites

none

### Recommendation

We recommend attending the course "Logistics - organization, design and control of logistic systems " (2118078) beforehand.

### Below you will find excerpts from events regarding this course:

**Global Production and Logistics - Part 2: Global Logistics**

2149600, SS 2019, 2 SWS, Open in study portal

**Description**

**Media:**

presentations, black board

**Learning Content**

Characteristics of global trade

- Incoterms
- Customs clearance, documents and export control

Global transport and shipping

- Maritime transport, esp. container handling
- Air transport

Modeling of supply chains

- SCOR model
- Value stream analysis

Location planning in cross-border-networks

- Application of the Warehouse Location Problem
- Transport Planning

Inventory Management in global supply chains

- Stock keeping policies

Inventory management considering lead time and shipping costs
Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
Elective literature:

- Arnold/Isermann/Kuhn/Tempelmeier. HandbuchLogistik, Springer Verlag, 2002 (Neuausgabe in Arbeit)
- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, Oldenbourg Verlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Tempelmeier. Bestandsmanagement in Supply Chains, Books on Demand 2006
### 7.164 Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101473 - Mathematische Optimierung  
- M-WIWI-102832 - Operations Research im Supply Chain Management  
- M-WIWI-103289 - Stochastische Optimierung

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**Competence Certificate**  
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**  
None

**Recommendation**  
Basic knowledge as conveyed in the module *Introduction to Operations Research* [WI1OR] is assumed.

**Annotation**  
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.
7.165 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 - Fahrzeugeigenschaften

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<td>Handling Characteristics of Motor Vehicles I</td>
<td>3</td>
<td>Each winter term</td>
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**Competence Certificate**
Verbally

**Duration:** 30 up to 40 minutes  
**Auxiliary means:** none

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

**Handling Characteristics of Motor Vehicles I**  
2113807, WS 18/19, 2 SWS, Open in study portal

**Learning 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

**Workload**
regular attendance: 22,5 hours  
self-study: 97,5 hours

**Literature**


T 7.166 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 - Fahrzeugeigenschaften

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**Course: Handling Characteristics of Motor Vehicles II**

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**Competence Certificate**  
Oral Examination  
Duration: 30 up to 40 minutes  
Auxiliary means: none

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

**Handling Characteristics of Motor Vehicles II**

2114838, SS 2019, 2 SWS, Open in study portal

**Learning 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

**Workload**  
regular attendance: 22,5 hours  
self-study: 97,5 hours

**Literature**  
T 7.167 Course: Heat Economy [T-WIWI-102695]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energiewirtschaft und Technologie

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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
None

Annotation
See German version.

**Responsible:** Dr.-Ing. Rainer Oberacker

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**

| SS 2019 | 2126749 | Advanced powder metals | 2 SWS | Lecture (V) | Schell |

**Competence Certificate**

oral exam, 20-30 min

**Prerequisites**

none

Below you will find excerpts from events regarding this course:

**Advanced powder metals**

2126749, SS 2019, 2 SWS, Open in study portal

**Learning Content**

The lecture gives an overview on production, properties and application of structural and functional powder metallurgy material. The following groups of materials are presented: PM High Speed Steels, Cemented Carbides, PM Metal Matrix Composites, PM Specialities, PM Soft Magnetic and Hard Magnetic Materials.

**Workload**

regular attendance: 22 hours
self-study: 98 hours

**Literature**

- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
### 7.169 Course: High-Voltage Technology I [T-ETIT-101913]

**Responsible:** Dr.-Ing. Rainer Badent

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:** M-ETIT-101163 - Hochspannungstechnik

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**Prerequisites**

none
### 7.170 Course: High-Voltage Technology II [T-ETIT-101914]

**Responsible:** Dr.-Ing. Rainer Badent  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** M-ETIT-101163 - Hochspannungstechnik

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#### Events

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**Prerequisites**  
none
7.171 Course: High-Voltage Test Technique [T-ETIT-101915]

**Responsible:** Dr.-Ing. Rainer Badent

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:** M-ETIT-101164 - Erzeugung und Übertragung regenerativer Energie

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**Prerequisites**

none
7.172 Course: Human Factors in Security and Privacy [T-WIWI-109270]

**Responsible:** Prof. Dr. Melanie Volkamer

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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**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.

**Prerequisites**
Successful participation in the exercises.

*Below you will find excerpts from events regarding this course:*
Description
The history of information security and privacy has taught us that it takes more than technological innovation to develop effective security and privacy mechanisms: Many aspects of information security and privacy actually depend on both technical and human factors. As a result of focusing on the technical factors, we are seeing a persistent gap between theoretical security and actual security in real world which becomes an increasing problem in the age of digitalization. The gap is mainly caused by strong and actually unrealistic assumptions regarding the users’ knowledge and behavior.

Human factors in security and privacy research addresses several types of security and privacy mechanisms, e.g., authentication mechanisms including text and graphical passwords, security and privacy indicators (such as the icons in the address bar of nowadays web browsers) and security and privacy interventions like warning messages, permission dialogs and security and privacy policies as well as corresponding configuration interfaces. Besides security and privacy mechanisms, human factors in security and privacy researchers deal with security and privacy awareness, education, and training approaches.

‘Human factors in security & privacy’ research areas are:

- identifying users’ mental models using techniques such as (semi-)structured interviews or focus groups,
- evaluating existing approaches regarding their effectiveness in supporting their users in making secure decisions / informed decisions in the context of privacy using techniques such as cognitive walkthroughs, lab user studies or even field studies,
- proposing improved / new approaches and evaluating their effectiveness using the so called human-centered security / privacy by design approach.

This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study.

Learning Content
This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. This includes the importance of mental models. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is also applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study.

Literature

- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
Course: Incentives in Organizations [T-WIWI-105781]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management

Part of:
M-WIWI-101453 - Angewandte strategische Entscheidungen
M-WIWI-101500 - Microeconomic Theory
M-WIWI-101505 - Experimentelle Wirtschaftsforschung
M-WIWI-101510 - Cross-Functional Management Accounting

Type: Prüfungsleistung schriftlich
Credits: 4,5
Recurrence: Each summer term
Version: 1

Events

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<td>1 SWS</td>
<td>Practice (Ü)</td>
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Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendation
Knowledge of microeconomics, game theory, and statistics is assumed.

Annotation
The course is carried out routinely in summer.

Below you will find excerpts from events regarding this course:

Incentives in Organizations
2573003, SS 2019, 2 SWS, Open in study portal

Learning Content
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Annotation
is carried out routinely in summer.

Workload
The total workload for this course is approximately 135 hours.
Lecture 32h
Preparation of lecture 52h
Exam preparation 51h
Literature
Literature (mandatory): Slides, case studies, and selected research papers announced in the lecture
Literature (additional):
Brickley / Smith / Zimmerman: Managerial Economics and Organizational Architecture
Camerer: Behavioral Game Theory
Lazear / Gibbs: Personnel Economics in Practice
Wooldridge: Introduction to Econometrics
Wooldridge: Econometric Analysis of Cross Section and Panel Data
7.174 Course: Industrial Services [T-WIWI-102822]

**Responsible:** Prof. Dr. Hansjörg Fromm

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101448 - Service Management
- M-WIWI-101506 - Service Analytics
- M-WIWI-102808 - Digital Service Systems in Industry

**Type**
- Prüfungsleistung schriftlich

**Credits**
- 4,5

**Recurrence**
- Each winter term

**Version**
- 1

**Events**

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<td>2595505</td>
<td><em>Industrial Services</em></td>
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<td></td>
<td>2595506</td>
<td><em>Übungen zu Industrial Services</em></td>
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</table>

**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**

None

Below you will find excerpts from events regarding this course:

---

**Industrial Services**

2595505, WS 18/19, 2 SWS, [Open in study portal]

**Learning Content**

Services are becoming ever more important in business. Today, the gross income share of services in Germany exceeds 70%. Following this trend, many companies that previously focused solely on the sale of goods, strive to extend their business model: in order to realize new competitive advantages in domestic and international markets, they enrich their material goods with customer-specific services. This transformation to a provider of integrated solutions is called "Servitization" (Neely 2009). For this reason, so-called industrial services to companies of increasing importance. They benefit from the increasingly detailed data collected (on "Big Data"), e.g. concerning user profiles, failure statistics, usage history, accrued expenses, etc. Only these data allow in principle to end products and spare parts are delivered faster, cheaper and more targeted and technicians can be used more efficiently with the correct skills. This requires, however, also suitable methods of optimization, prognosis or predictive modeling. When used properly, such methods can minimize logistics costs, increase availability, prevent potential failures and improve repair planning. This is also enabled by latest "Technology Enabled Services" along with corresponding data transfer and analysis ("Internet of Things", automatic error detection, remote diagnostics, centralized collection of consumption data, etc.). The change from goods manufacturer to a provider of integrated solutions requires new services, transformation of business models as well as intelligent new contract types, which are addressed in the course as well.

More specifically, the lessons of this lecture will include:

- Servitization – The Manufacturer's Transformation to Integrated Solution Provider
- Service Levels – Definitions, Agreements, Measurements and Service Level Engineering
- The "Services Supply Chain"
- Spare Parts Planning – Forecasting, Assortment Planning, Order Quantities and Safety Stocks
- Distribution Network Planning – Network Types, Models, Optimization
- Service Technician Planning
- Condition Monitoring, Predictive Maintenance, Diagnose Systems
- Call Center Services
- Full Service Contracts
- IT-enabled Value-Add Services – Industrial Service Innovation
Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature


## 7.175 Course: Information Engineering [T-MACH-102209]

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

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

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### Events

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<th>Information Engineering</th>
<th>2 SWS</th>
<th>Seminar (S)</th>
<th>Ovtcharova, Mitarbeiter</th>
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**Competence Certificate**  
Alternative exam assessment (written composition and speech)

**Prerequisites**  
None
Course: Information Management for public Mobility Services [T-BGU-106608]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101064 - Grundlagen des Verkehrswesens
- M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Events**

| SS 2019 | 6232813 | Informationsmanagement für öffentliche Mobilitätsangebote | 2 SWS | Block (B) | Vortisch |

**Competence Certificate**
lecture accompanying exercises, appr. 5 pieces

**Prerequisites**
none

**Recommendation**
none

**Annotation**
none
### Course: Information Service Engineering [T-WIWI-106423]

**Responsible:** Prof. Dr. Harald Sack  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik

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**Events**

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**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation. The exam takes place every semester and can be repeated at every regular examination date.

**Prerequisites**

None

**Annotation**

New course starting summer term 2017.

*Below you will find excerpts from events regarding this course:*

**Information Service Engineering**  
2511606, SS 2019, 2 SWS, Open in study portal

**Lecture (V)**
Learning Content
- Information, Natural Language and the Web

- Natural Language Processing
  - NLP and Basic Linguistic Knowledge
  - NLP Applications, Techniques & Challenges
  - Evaluation, Precision and Recall
  - Regular Expressions and Automata
  - Tokenization
  - Language Model and N-Grams
  - Part-of-Speech Tagging

- Linked Data Engineering
  - Knowledge Representations and Ontologies
  - What’s in an URI?
  - Resource Description Framework (RDF)
  - Creating new Models with RDFS
  - Querying RDF(S) with SPARQL
  - More Expressivity with Web Ontology Language (OWL)
  - The Web of Data
  - Vocabularies and Ontologies in the Web of Data
  - Wikipedia, DBpedia, and Wikidata

- Information Retrieval
  - Information Retrieval Models
  - Retrieval Evaluation
  - Web Information Retrieval
  - Document Crawling, Text Processing, and Indexing
  - Query Processing and Result Representation
  - Question Answering

- Knowledge Mining
  - From Data to Knowledge
  - Data Mining
  - Machine Learning Basics for Knowledge Mining
  - Mining Knowledge from Wikipedia
  - Named Entity Resolution

- Exploratory Search and Recommender Systems
  - Semantic Search and Entity Centric Search
  - Collaborative Filtering and Content Based Recommendations
  - From Search to Intelligent Browsing
  - Linked Data Based Exploratory Search
  - Fact Ranking

Annotation
New lecture, since summer semester 2017

Literature
7.178 Course: Information Systems and Supply Chain Management [T-MACH-102128]

**Responsible:** Dr. Christoph Kilger  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-MACH-101263 - Einführung in die Logistik  
M-MACH-101280 - Logistik in Wertschöpfungsnetzwerken  
M-MACH-101282 - Globale Produktion und Logistik

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**Events**

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<td>Information Systems in Logistics and Supply Chain Management</td>
<td>2</td>
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</table>

**Competence Certificate**

The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**

none

**Below you will find excerpts from events regarding this course:**

**Information Systems in Logistics and Supply Chain Management**  
2118094, SS 2019, 2 SWS, Open in study portal

**Description**

**Media:**

presentations

**Learning Content**

1) Overview of logistics systems and processes
2) Basic concepts of information systems and information technology
3) Introduction to IS in logistics: Overview and applications
4) Detailed discussion of selected SAP modules for logistics support

**Annotation**

none

**Workload**

regular attendance: 21 hours  
self-study: 99 hours

**Literature**

7.179 Course: Infrastructure Management [T-BGU-106300]

Responsible: Prof. Dr.-Ing. Ralf Roos
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-100998 - Entwurf, Bau, Betrieb und Erhaltung von Straßen
M-BGU-100999 - Straßenwesen

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Events

| SS 2019 | 6233801 | Entwurf und Bau von Straßen | 2 SWS | Lecture (V) | Roos |
| SS 2019 | 6233802 | Betrieb und Erhaltung von Straßen | 2 SWS | Lecture (V) | Roos |

Competence Certificate
written exam, 120 min.

Prerequisites
none

Recommendation
none

Annotation
none

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovationsmanagement

Events

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</table>

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
None

Below you will find excerpts from events regarding this course:

Innovation Management: Concepts, Strategies and Methods

Notes
The lecture will be held in German.

Learning Content
The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application.

The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfill the diverse demands of the complex innovation process. The course focuses particularly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addition to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of integrated knowledge.

Annotation
This course was formerly named "Innovation Management".

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
A detailed bibliography is provided with the lecture notes.
### Course: Innovation theory and -Policy [T-WIWI-102840]

**Responsibility:** Prof. Dr. Ingrid Ott  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101478 - Innovation und Wachstum  
M-WIWI-101497 - Agglomeration und Innovation  
M-WIWI-101514 - Innovationsökonomik

#### Events

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<th>Term</th>
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<td>SS 2019</td>
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<td>Innovation theory and -policy</td>
<td>SWS</td>
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<td>Übung zu Innovationstheorie und -politik</td>
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#### Competence Certificate

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

#### Prerequisites

None

#### Recommendation

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

#### Below you will find excerpts from events regarding this course:

**Innovation theory and -policy**

*2560236, SS 2019, SWS, Open in study portal*

**Learning Content**

- Incentives for the emergence of innovations  
- Patents  
- Diffusion  
- Impact of technological progress  
- Innovation Policy

**Workload**

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

Excerpt:

### 7.182 Course: Insurance Marketing [T-WIWI-102601]

**Responsible:** Edmund Schwake  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101449 - Insurance Management II

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<td>Each summer term</td>
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#### Competence Certificate
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation). The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

#### Prerequisites
None

#### Recommendation
None
**7.183 Course: Insurance Production [T-WIWI-102648]**

**Responsible:** Prof. Dr. Ute Werner  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101449 - Insurance Management II

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**Competence Certificate**

The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation). The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

T-WIWI-102648 Insurance Production will be offered latest until summer term 2017 (beginners only).

**Prerequisites**

None

**Recommendation**

None

**Annotation**

This course is offered on demand. For further information, see: http://insurance.fbv.kit.edu
7.184 Course: Insurance Risk Management [T-WIWI-102636]

**Responsible:** Harald Maser

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101449 - Insurance Management II

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**Competence Certificate**
The assessment consists of a written or an oral exam (according to Section 4 (2), 1 or 2 of the examination regulation).

T-WIWI-102636 Insurance Risk Management will be offered as a seminar starting summer term 2017. The examination will be offered latest until summer term 2017 (beginners only).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
Block course. For organizational reasons, please register with the secretary of the chair: thomas.mueller3@kit.edu.
7.185 Course: Integrated Product Development [T-MACH-105401]

**Responsible:** Prof. Dr.-Ing. Albert Albers
Albers Assistenten

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-102626 - Schwerpunkt: Integrierte Produktentwicklung

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**Competence Certificate**
oral examination (60 minutes)

**Prerequisites**
none

**Annotation**
Due to organizational reasons, the number of participants is limited. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK homepage from April to July. The selection itself is made by Prof. Albers in personal interviews.

*Below you will find excerpts from events regarding this course:*

**Integrated Product Development**
2145156, WS 18/19, 4 SWS, [Open in study portal]

**Learning Content**
organizational integration: integrated product engineering model, core team management and simultaneous engineering
informational integration: innovation management, cost management, quality management and knowledge management
personal integration: team coaching and leadership management
invited lectures

**Annotation**
The lecture starts in first week of October.

**Workload**
regular attendance: 84 h
self-study: 288 h

**Literature**
Klaus Ehrlenspiel - Integrierte Produktentwicklung. Denkabläufe, Methodeneinsatz, Zusammenarbeit, Hanser Verlag, 2009

**Workshop Product Development**
2145157, WS 18/19, 4 SWS, [Open in study portal]

**Practice (Ü)**

**Learning Content**

problem solving: analysis techniques, creativity techniques and evaluation methods
professional skills: presentation techniques, moderation and teamcoaching
development tools: MS Project, Szenario-Manager & Pro/Engineer Wildfire

**Workload**

lectures: 21 h
preparation to exam: 99 h

**Literature**

none

---

**Project Work in Product Development**

2145300, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**

The project work begins with the early stages of product development, i.e. the identification of market trends and needs. Based on this information the students develop scenarios for future markets and create product profiles, which describe the customers and their demands without anticipating possible product solutions. After having passed several following milestones for ideas, concepts and designs, virtual prototypes and function prototypes are presented to an audience. The project work is supported by coaching through skilled faculty staff. Additionally weekly tutorials, respectively workshops are given. For doing the project the teams gain access to team workspaces featuring IT-infrastructure and relevant software, such as office, CAD or FEA. Further on the teams learn how team cooperation and knowledge management can be supported in design project by using a wiki system.

**Workload**

regular attendance: 21 h
self-study: 99 h
7 COURSES

7.186 Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-109054]

Responsibility: Prof. Dr.-Ing. Gisela Lanza

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101272 - Integrierte Produktionsplanung

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Events

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<td>6 SWS</td>
<td>Integrated Production Planning in the Age of Industry 4.0</td>
<td>Lanza</td>
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</table>

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 regarding this course:

Integrated Production Planning in the Age of Industry 4.0

2150660, SS 2019, 6 SWS, Open in study portal

Description

Media:

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

Learning 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.

Industrial Engineering and Management M.Sc.
Module Handbook as of 04.03.2019
Workload

MACH:
regular attendance: 63 hours
self-study: 177 hours

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

Literature
Lecture Notes
7.187 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Responsibility: Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101282 - Globale Produktion und Logistik
M-MACH-101284 - Vertiefung der Produktionstechnik

Event:
SS 2019 2150601 Integrative Strategies in Production and Development of High Performance Cars 2 SWS Lecture (V) Schlichtenmayer

Competence Certificate
Written Exam (60 min)

Prerequisites
none

Below you will find excerpts from events regarding this course:

**Integrative Strategies in Production and Development of High Performance Cars** 2150601, SS 2019, 2 SWS, Open in study portal

**Lecture (V)**

**Description**

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

**Learning 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

**Workload**
regular attendance: 21 hours
self-study: 99 hours

**Literature**
Lecture Slides
7 COURSES

Course: Intelligent CRM Architectures [T-WIWI-103549]

7.188 Course: Intelligent CRM Architectures [T-WIWI-103549]

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

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<td>Practice (Ü)</td>
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Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
It is recommended to additionally review the Bachelor-level lecture "Customer Relationship Management" from the module "CRM and Servicemanagement".

Below you will find excerpts from events regarding this course:

Intelligent CRM Architectures
2540525, WS 18/19, 2 SWS, Open in study portal

Learning Content
The lecture is structured in three parts:
In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance
- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m
Literature

7.189 Course: Interactive Information Systems [T-WIWI-108461]

**Responsible:** Prof. Dr. Alexander Mädche  
Dr. Stefan Morana

**Organisation:** KIT Department of Economics and Management

**Part of:**  
M-WIWI-104068 - Information Systems in Organizations  
M-WIWI-104080 - Designing Interactive Information Systems

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**Events**

| SS 2019 | 2540558 | Interactive Systems | 3 SWS | Lecture (V) | Mädche, Morana |

**Competence Certificate**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation. Students receive one aggregated grade consisting of a written exam (70%) and research paper (30%). The exam and the research paper need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the research paper.

**Prerequisites**

None

**Annotation**

This course replaces T-WIWI-106342 "Interactive Systems" starting summer term 2018. The course is held in english.

Below you will find excerpts from events regarding this course:

**Interactive Systems**

2540558, SS 2019, 3 SWS, Open in study portal

**Description**

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

With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. The aim of this course is to introduce the foundations, theoretical grounding, key concepts and principles as well as current practice of interactive systems. The contents of the course abstract from the technical implementation details. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

**Notes**

The lecture is complemented with a capstone project assignment, where students analyze and review existing interactive systems and suggest areas of improvement / extensions.

**Learning Content**

- Basics
- Theoretical foundations
- Key concepts and design principles for specific interactive systems classes
- Capstone project
**Literature**
The lecture bases to a large extend on


Additional literature will be provided in the lecture.
7.190 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

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<td>Walter, Uhrig-Homburg</td>
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Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Annotation
See German version.

Below you will find excerpts from events regarding this course:

International Finance
2530570, SS 2019, 2 SWS, Open in study portal

Description
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor and second that of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore, current exchange rate theories are discussed.

Learning Content
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor and second that of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore, current exchange rate theories are discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:
7.191 Course: International Management in Engineering and Production [T-WIWI-102882]

Responsible: Dr. Henning Sasse
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrielle Produktion III
M-WIWI-101471 - Industrielle Produktion II

Type: Prüfungsleistung schriftlich
Credits: 3,5
Recurrence: Each winter term
Version: 1

Events

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<td>2 SWS</td>
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Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events regarding this course:

International Management in Engineering and Production
2581956, WS 18/19, 2 SWS, Open in study portal

Learning Content

- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
Will be announced in the course.
# 7.192 Course: Internet Law [T-INFO-101307]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101215 - Recht des Geistigen Eigentums

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**Events**

| WS 18/19 | 24354 | Internet Law | 2 SWS | Lecture (V) | Dreier |

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-INFO-108462 - Selected legal issues of Internet law must not have been started.
**7.193 Course: Introduction to Ceramics [T-MACH-100287]**

**Responsible:** Prof. Dr. Michael Hoffmann  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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<td>WS 18/19</td>
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<td>Introduction to Ceramics</td>
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<td>Lecture (V)</td>
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**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 regarding this course:**

### Introduction to Ceramics

**Description**

**Media:**

Slides for the lecture:

available under [http://www.iam.kit.edu/km](http://www.iam.kit.edu/km)

**Learning Content**

After a short introduction to interatomic bonding, fundamental concepts of crystallography, the stereographic projection and the most important symmetry elements will be given. Different types of crystal structures are explained and the relevance of imperfections are analysed with respect to the mechanical and electrical properties of ceramics. Then, the impact of surfaces, interfaces and grain boundaries for the preparation, microstructural evolution and the resulting properties is discussed. Finally, an introduction is given to ternary phase diagrams.

The second part of the course covers structure, preparation and application aspects of nonmetallic inorganic glasses, followed by an introduction to the properties and processing methods of fine-grained technical powders. The most relevant shaping methods, such as pressing, slip casting, injection moulding and extrusion are introduced. Subsequently, the basics of science of sintering and the mechanisms for normal and abnormal grain growth are discussed. Mechanical properties of ceramics are analysed using basic principles of linear elastic fracture mechanics, Weibull statistics, concepts for subcritical crack growth and creep models to explain the behaviour at elevated temperatures. Furthermore it is demonstrated that mechanical properties can be significantly enhanced by various types of microstructural toughening mechanisms. The electronic and ionic conductivity of ceramic materials are explained based on defect-chemical considerations and band structure models. Finally, the characteristics of a dielectric, pyroelectric, and piezoelectric behaviour is discussed.

**Workload**

regular attendance: 45 hours  
self-study: 135 hours

**Literature**

- 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
7.194 Course: Introduction to Hydrogeology [T-BGU-101499]

**Responsible:** Prof. Dr. Nico Goldscheider

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-WIWI-101642 - Naturgefahren und Risikomanagement 1
- M-WIWI-101644 - Naturgefahren und Risikomanagement 2
- M-WIWI-104837 - Naturgefahren und Risikomanagement

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**Competence Certificate**

Written exam with 90 minutes

**Prerequisites**

none
7.195 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 - Mikrosystemtechnik

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<td>Lecture (V)</td>
<td>Korvink, Badilita</td>
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**Competence Certificate**
written examination for implementation in a major field, 30 min oral exam for elective subject

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

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<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Korvink, Badilita</td>
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</table>

**Learning Content**
- Introduction in Nano- and Microtechnologies
- Silicon and processes for fabricating microelectronics circuits
- Basic physics background and crystal structure
- Materials for micromachining
- Processing technologies for microfabrication
- Silicon micromachining
- Examples

**Workload**
- Literature: 20 h
- Lessons: 21 h
- Preparation and Review: 50 h
- Exam preparation: 30 h

**Literature**
M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011
7 COURSES

Course: Introduction to Microsystem Technology II [T-MACH-105183]

7.196 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 - Mikrosystemtechnik

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Competence Certificate

written examination for major field, oral exam (30 min) for elective field

Prerequisites

none

Below you will find excerpts from events regarding this course:

Introduction to Microsystem Technology II
2142874, SS 2019, 2 SWS, Open in study portal

Learning Content

- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

Workload

Literature: 20 h
Lessons: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

Literature

M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011
### Course: Introduction to Stochastic Optimization [T-WIWI-106546]

**Responsible:** Prof. Dr. Steffen Rebennack

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-102832 - Operations Research im Supply Chain Management
- M-WIWI-103289 - Stochastische Optimierung

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**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.
### 7.198 Course: IoT platform for engineering [T-MACH-106743]

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

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

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**Competence Certificate**  
Assessment of another type (graded), procedure see webpage. Number of participants limited to 20 people. There is a participant selection process.

**Below you will find excerpts from events regarding this course:**

**IoT platform for engineering**  
2123352, WS 18/19, SWS, [Open in study portal](#)  
Project/Seminar (PJ/S)

**Learning Content**  
Industry 4.0, IT systems for fabrication and assembly, process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

**Notes**  
Number of participants limited to 15 people. There is a participant selection process.
Course: IT- Security Law [T-INFO-109910]

**Responsible:** Dr. Yvonne Matz  
PD Dr. Oliver Raabe

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101242 - Governance, Risk & Compliance

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**Events**

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<td>2400007</td>
<td>IT security law</td>
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7.200 Course: IT-Based Road Design [T-BGU-101804]

**Responsible:** Dr.-Ing. Matthias Zimmermann

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101066 - Sicherheit, EDV und Recht im Straßenwesen

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**Kompetenz Zertifikat**

oral exam with 15 minutes

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.201 Course: IT-Fundamentals of Logistics [T-MACH-105187]

**Responsible:** Prof. Dr.-Ing. Frank Thomas

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101263 - Einführung in die Logistik
- M-MACH-101279 - Technische Logistik

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**Events**

| SS 2019 | 2118183 | IT-Fundamentals of Logistics | 2 SWS | Lecture (V) | Thomas |

**Competence Certificate**
The assessment consists of an oral exam (30min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**
none

**Annotation**
1) Detailed script can be downloaded online (www.tup.com), updated and enhanced annually.
2) CD-ROM with chapters and exercises at the end of the semester available from the lecturer, also updated and enhanced annually.

Below you will find excerpts from events regarding this course:

**IT-Fundamentals of Logistics**
2118183, SS 2019, 2 SWS, Open in study portal
Learning Content
The rapid development of information technology influences business processes drastically.
A strategic IT-orientation for an enterprise without a critical appreciation of worldwide IT-development (where the half-life value of IT for logistic systems knowledge is less than 3 years) is dangerous. The pressure of costs is always in focus. For this purpose the contents of this course, as well as the detailed script will be continuously revised, and the influences on business processes will be shown in practical examples.

Focuses:

• System architecture in Material Flow Control Systems (MFCS)

A guiding principle for a new system architecture for MFC systems is the consideration of making new standardized, functional groups available for re-usability.

• Design and application of innovative Material Flow Control Systems (MFCS)

The most important task of the MFCS is the commissioning of conveying systems with driving commands in a way that optimally utilizes the facility and serves the logistics processes on schedule.

• Identification of goods – Application in Logistics

Along with business processes, coded information is the link between the flow of information and the flow of materials, and contributes to error prevention in the communication between people and machines.

• Data communication in Intra-logistics

Information describes the content of a message that is of value to the recipient. The recipient can be both a human and a machine.

• Business processes for Intra-logistics – Software follows function!

If the business processes from Goods Incoming to Goods Outgoing are adapted with reusable building blocks then capabilities become visible. Against this background the consideration becomes apparent, how, through an innovative software architecture, a reusable building-block based framework can be made. Therefore applies: Software follows function. And only if all project requirements are documented in the planing phase, and supported together in an inter-disciplinary team - consisting of logistics planners, the customers (users) and the implementation leader (IL).

• Software development in accordance with industrial standards

Today's development of object-oriented software, and the increasing penetration of industrial software production with this technology, makes it possible to create system designs that already offer these opportunities in their facility - both for a high degree of reuse and for easier adaptability.
In software development, object-oriented methods are used to improve the productivity, maintainability and software quality. An important aspect of object-orientation is: the objects used are primarily intended to depict the real world.

Annotation
1) Detailed script can be downloaded online (www.tup.com), updated and enhanced annually.
2) CD-ROM with chapters and exercises at the end of the semester available from the lecturer, also updated and enhanced annually.

Workload
regular attendance: 21 hours
self-study: 99 hours
Competence Certificate
The learning control of the program (Summer School) consists of two parts:

A) Investor Pitch:
Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.

B) Written elaboration:
The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyses and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.

The grade consists of 50% presentation performance and 50% written preparation.

Prerequisites
The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

Recommendation
We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

Annotation
The working language during the Summer School is English. A one-week stay in China is part of the Summer School.
7.203 Course: Knowledge Discovery [T-WIWI-102666]

**Responsible:** Prof. Dr. York Sure-Vetter

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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<td>2511302</td>
<td>Knowledge Discovery</td>
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<td>Sure-Vetter, Rettinger</td>
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<td>Exercises to Knowledge Discovery</td>
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<td>Practice (Ü)</td>
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### Competence Certificate

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation. Students can be awarded a bonus on their final grade if they successfully complete special assignments.

### Prerequisites

None

**Below you will find excerpts from events regarding this course:**

#### Knowledge Discovery

**2511302, WS 18/19, 2 SWS, [Open in study portal](#)**

**Description**

Knowledge discovery is a well-established field with a large community investigating methods for the discovery of patterns and regularities in large data sets, including relational databases and unstructured text. A variety of methods are available to assist in extracting patterns that, if interpreted, provide valuable, possibly previously unknown, insights. This information can be predictive or descriptive in nature.

This lecture provides an overview of this field. The lecture imparts specific techniques and methods, challenges and current and future research work in this field.

**Learning Content**

Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empirical evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others feauturevector-based learning, text mining and social network analysis.

**Workload**

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours
Description
Multiple exercises are held that capture the topics, held in the lecture Knowledge Discovery, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

Learning Content
Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empirical evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others featurevector-based learning, text mining and social network analysis.

Workload
The total workload for the lecture Knowledge Discovery is given out on the description of the lecture.

Literature
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley
Course: Laboratory Laser Materials Processing [T-MACH-102154]

**Responsible:** Dr.-Ing. Johannes Schneider  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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<td>Laboratory &quot;Laser Materials Processing&quot;</td>
<td>3 SWS</td>
<td>Practical course (P)</td>
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**Competence Certificate**  
The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

**Prerequisites**  
none

**Recommendation**  
basic knowledge of physics, chemistry and material science  
The attendance to one of the courses Physical Basics of Laser Technology (2181612) or Laser Application in Automotive Engineering (2182642) is strongly recommended.

**Annotation**  
The maximum number of students is 12 per semester.

Below you will find excerpts from events regarding this course:

**Laboratory "Laser Materials Processing"**  
2183640, WS 18/19, 3 SWS, [Open in study portal](#)  
Practical course (P)

**Description**  
**Media:**  
lecture notes via ILIAS

**Learning Content**  
The laboratory compromises 8 half-day experiments, which address the following laser processing topics of metals, ceramics and polymers:  
- safety aspects  
- surface hardening and remelting  
- melt and reactive cutting  
- surface modification by dispersing or alloying  
- welding  
- surface texturing  
- metrology  
There are used CO2-, excimer-, Nd:YAG- and high power diode-laser sources within the laboratory.

**Annotation**  
The maximum number of students is 12 per semester.
Workload
regular attendance: 34 hours
self-study: 86 hours

Literature

Description
Media:
lecture notes via ILIAS

Learning Content
The laboratory compromises 8 half-day experiments, which address the following laser processing topics of metals, ceramics and polymers:
• safety aspects
• surface hardening and remelting
• melt and reactive cutting
• surface modification by dispersing or alloying
• welding
• surface texturing
• metrology
There are used CO2-, excimer-, Nd:YAG- and high power diode-laser sources within the laboratory.

Annotation
The maximum number of students is 12 per semester.

Workload
regular attendance: 34 hours
self-study: 86 hours

Literature
7.205 Course: Laboratory Production Metrology [T-MACH-108878]

**Responsible:** Dr.-Ing. Benjamin Häfner  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101284 - Vertiefung der Produktionstechnik

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**Events**

| SS 2019 | 2150550 | Laboratory Production Metrology | 3 SWS | Practical course (P) | Häfner |

**Competence Certificate**
Alternative test achievement:
Group presentation

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

**Description**
Lecture notes will be provided in Ilias ([https://ilias.studium.kit.edu/](https://ilias.studium.kit.edu/)). Additional reference to literature will be provided, as well.

**Notes**
For organizational reasons the number of participants for the course is limited. Hence an selection process will take place. Applications are made via the homepage of wbk ([http://www.wbk.kit.edu/studium-und-lehre.php](http://www.wbk.kit.edu/studium-und-lehre.php)).

**Learning 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 focused. Additionally, laboratory-based measurement technologies such as computed tomography are addressed. The student 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
- Coordinate measurement technology
- Industrial computed tomography
- Measurement uncertainty evaluation
- Analysis of production data by means of data mining

**Workload**
regular attendance: 31,5 hours  
self-study: 88,5 hours
### 7.206 Course: Laboratory Work Water Chemistry [T-CIWVT-103351]

**Responsible:** Dr. Gudrun Abbt-Braun  
Prof. Dr. Harald Horn

**Organisation:** KIT Department of Chemical and Process Engineering

**Part of:** M-CIWVT-101121 - Wasserchemie und Wassertechnologie I

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**Prerequisites**

none
7.207 Course: Large-scale Optimization [T-WIWI-106549]

**Responsible:** Prof. Dr. Steffen Rebennack

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101473 - Mathematische Optimierung
- M-WIWI-102832 - Operations Research im Supply Chain Management
- M-WIWI-103289 - Stochastische Optimierung

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**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.
7 COURSES

Course: Laser in Automotive Engineering [T-MACH-105164]

7.208 Course: Laser in Automotive Engineering [T-MACH-105164]

| Responsible: | Dr.-Ing. Johannes Schneider |
| Organisation: | KIT Department of Mechanical Engineering |

Part of: M-MACH-101268 - Spezielle Werkstoffkunde

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<td>SS 2019</td>
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Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with brick Physical Basics of Laser Technology [T-MACH-109084] and brick Physical Basics of Laser Technology [T-MACH-102102]

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-102102 - Physical Basics of Laser Technology must not have been started.

Recommendation
preliminary knowledge in mathematics, physics and materials science

Below you will find excerpts from events regarding this course:

Laser in automotive engineering
2182642, SS 2019, 2 SWS, Open in study portal

Description
Media:
lecture notes via ILIAS

Learning Content
Based on a short description of the physical basics of laser technology the lecture reviews the most important high power lasers and their various applications in automotive engineering. Furthermore the application of laser light in metrology and safety aspects will be addressed.

- physical basics of laser technology
- laser beam sources (Nd:YAG-, CO2-, high power diode-laser)
- beam properties, guiding and shaping
- basics of materials processing with lasers
- laser applications in automotive engineering
- economical aspects
- safety aspects

Annotation
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.
Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature
7.209 Course: Laser Physics [T-ETIT-100741]

Responsible: Prof. Dr.-Ing. Christian Koos
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Mikrooptik
M-MACH-101295 - Optoelektronik und Optische Kommunikationstechnik

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7.211 Course: Laws concerning Traffic and Roads [T-BGU-106615]

**Responsible:** Dr. Dietmar Hönig

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101066 - Sicherheit, EDV und Recht im Straßenwesen

### Type
Prüfungsleistung schriftlich

### Credits
3

### Recurrence
Each summer term

### Version
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**Events**

| SS 2019 | 6233803 | Verkehrs-, Planungs- und Wegerecht |

**Competence Certificate**

Written exam, 60 min.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
### 7.212 Course: Lean Construction [T-BGU-108000]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101884 - Lean Management im Bauwesen

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**Competence Certificate**

written exam, 70 min.

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
**T 7.213 Course: Learning Factory “Global Production” [T-MACH-105783]**

**Responsibility:** Prof. Dr.-Ing. Gisela Lanza

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101282 - Globale Produktion und Logistik
- M-MACH-101284 - Vertiefung der Produktionsstechnik

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**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**

Successful completion of one of the following courses:

- Integrated Production Planning in the Age of Industry 4.0 [T-MACH-108849 or T-MACH-109054]
- Integrated Production Planning [T-MACH-102106]
- Global Production and Logistics – Part 1: Global Production [T-MACH-105158]
- Quality Management [T-MACH-102107]

**Modeled Conditions**

You have to fulfill one of the 5 conditions:

1. The course 0x6D4E1F5E8697A1428D1FF3BD9E02027B must have been passed.
2. The course T-MACH-105158 - Global Production and Logistics - Part 1: Global Production must have been passed.
3. The course T-MACH-102107 - Quality Management must have been passed.
4. The course 0x05E4A72EBC344495A48A637E4DB3CE4C must have been passed.
5. The course T-MACH-109054 - Integrated Production Planning in the Age of Industry 4.0 must have been passed.

**Below you will find excerpts from events regarding this course:**

**V Lernfabrik Globale Produktion**

2149612, WS 18/19, 2 SWS, Open in study portal

**Description**

Media:

- e-learning platform ilias, powerpoint, photo protocol. The media are provided through ilias (https://ilias.studium.kit.edu/).

**Notes**

For organizational reasons the number of participants for the course is limited to 20. Hence a selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).
Learning Content
The learning factory “Global Production” serves as a modern teaching environment for the challenges of global production. To make these 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

Workload
E-Learning: ~ 24 h
Regular attendance: ~ 36 h
Self-study: ~ 60 h
7.214 Course: Liberalised Power Markets [T-WIWI-107043]

**Responsible:** Prof. Dr. Wolf Fichtner  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101451 - Energiewirtschaft und Energiemärkte  
M-WIWI-102808 - Digital Service Systems in Industry

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**Competence Certificate**
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

**Prerequisites**
See German version.

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Liberalised Power Markets**
2581998, WS 18/19, 2 SWS, [Open in study portal]

**Learning Content**
1. The European liberalisation process  
1.1 The concept of a competitive market  
1.2 The regulated market  
1.3 Deregulation in Europe  
2. Pricing and investments in a liberalised power market  
2.1 Merit order  
2.2 Prices and investments  
2.3 Market flaws and market failure  
2.4 Regulation in liberalised markets  
2.5 Additional regulation mechanisms  
3. The power market and the corresponding submarkets  
3.1 List of submarkets  
3.2 Types of submarkets  
3.3 Market rules  
4. Risk management  
4.1 Uncertainties in a liberalised market  
4.2 Investment decisions under uncertainty  
4.3 Estimating future electricity prices  
4.4 Portfolio management  
5. Market power  
5.1 Defining market power  
5.2 Indicators of market power  
5.3 Reducing market power  
6. Market structures in the value chain of the power sector

**Annotation**
The course "Basics of Liberalised Energy Markets" [2581998] will be reduced to 3 credits in winter term 2015/2016 and the tutorial [2581999] is no longer offered.
Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Elective literature:
# 7.215 Course: Life Cycle Assessment [T-WIWI-103133]

**Responsible:** Dr. Heiko Keller  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101412 - Industrielle Produktion III  
- M-WIWI-101471 - Industrielle Produktion II

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## Competence Certificate
The assessment consists of an oral exam (30 min.) or a written exam (60 min.).

## Prerequisites
None.

## Recommendation
None

Below you will find excerpts from events regarding this course:

### Life Cycle Assessment
2581995, WS 18/19, 2 SWS, Open in study portal

## Learning Content
Our society has reached a historically unique material prosperity. At the same time, environmental burdens and resource consumption are continuously reaching new peaks - not only regarding greenhouse gas emissions and oil production rates. It is obvious that the material and energy intensity of products and services has to decrease if we want to keep our current level of material prosperity on the long run. Enormous efficiency gains, as they have been reached e.g. for labour productivity, however, require that environmental burdens and resource consumption per unit of product are in the first place known, transparent and can thus be optimised. This data and its calculation are increasingly requested and sooner or later will have to become as essential for management as e.g. unit labour costs.

Life cycle assessment is a methodology in sustainability assessment that provides this information and deduces optimisation potentials and decision support for companies, politics, consumers etc. To this end, material and energy flows are compiled along the whole life cycle of a product from extraction of raw materials, via production and use of a product until its disposal. Subsequently, environmental impacts of these flows are analysed.

This lecture describes structure and individual steps of life cycle assessments in detail. Furthermore, it explains its application in decision support. In interactive phases, participants recapitulate the theoretical basis by own calculations. As an outlook, further instruments in sustainability assessment are introduced that analyse other sustainability aspects.

## Workload
Total effort required will account for approximately 105h (3.5 credits).

## Literature
will be announced in the course
Course: Logistics - Organisation, Design and Control of Logistic Systems [T-MACH-102089]

**Responsible:** Prof. Dr.-Ing. Kai Furmans

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101280 - Logistik in Wertschöpfungsnetzwerken

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**Events**

| SS 2019 | 2118078 | Logistics - Organisation, Design, and Control of Logistic Systems | 3 SWS | Lecture (V) | Furmans |

**Competence Certificate**
The assessment consists of a 90 minutes written examination (according to §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
Required are lectures on "Linear Algebra" and "Stochastic".

Below you will find excerpts from events regarding this course:

**Logistics - Organisation, Design, and Control of Logistic Systems**
2118078, SS 2019, 3 SWS, Open in study portal

**Description**

**Media:**
Blackboard, LCD projector, in excercises also PCs.
Learning Content

Introduction

- historical overview
- lines of development

Structure of logistics systems

Distribution logistics

- location planning
- Vehicle Routing Planning
- distribution centers

Inventory management

- demand forecasting
- Inventory management policies
- Bullwhip effect

Production logistics

- layout planning
- material handling
- flow control

Supply Management

- information flow
- transportation organization
- controlling and development of a logistics system
- co-operation mechanisms
- Lean SCM
- SCOR model

Identification Technologies

Workload

180 hrs

Literature

- Arnold/Isermann/Kuhn/Tempelmeier. Handbuch Logistik, Springer Verlag, 2002 (Neuausgabe in Arbeit)
- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexel. Logistik, Standorte, Oldenbourg Verlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Tempelmeier. Bestandsmanagement in Supply Chains, Books on Demand 2006
# 7.217 Course: Long-Distance and Air Traffic [T-BGU-106301]

**Responsible:** Bastian Chlond  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101064 - Grundlagen des Verkehrswesens  
- M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Competence Certificate**  
written exam, 60 min.

**Prerequisites**  
none

**Recommendation**  
none

**Annotation**  
none
7.218 Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

**Responsible:** Prof. Dr.-Ing. Johann Marius Zöllner

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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**Competence Certificate**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation. The exam takes place every semester and can be repeated at every regular examination date.

**Prerequisites**
None.

**Annotation**

**Below you will find excerpts from events regarding this course:**

**Machine Learning 1 - Fundamental Methods**
2511500, WS 18/19, 2 SWS, [Open in study portal]

**Description**
The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

**Learning Content**
The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.


**Literature**
The slides are available as a PDF

**Related Literature**

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

*Further (specific) literature on individual topics will be given in the lecture.*
7 COURSES

7.219 Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

**Responsible:** Prof. Dr.-Ing. Johann Marius Zöllner

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik
- M-WIWI-101637 - Analytics und Statistik

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**Events**

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**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation. The exam takes place every semester and can be repeated at every regular examination date.

**Prerequisites**

None.

**Annotation**

New course starting summer term 2017.

**Below you will find excerpts from events regarding this course:**

---

**Machine Learning 2 - Advanced methods**

2511502, SS 2019, 2 SWS, Open in study portal

**Lecture (V)**

**Description**

The field of machine decision-making and inference procedures, taking into account uncertainties and incomplete knowledge, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The focus of this lecture is on the embedding and application of machine-learning methods in decision and inference systems starting with methods of dimension reduction, feature selection/evaluation via semi-supervised learning to methods of probabilistic inference (e.g. Dempster Shafer information fusion, dynamic and object-oriented Bayesian networks, POMDP, etc).

The lecture introduces the basic principles and structures and explains algorithms developed so far. The structure and operation of the procedures and methods are presented and explained using a number of application scenarios, in particular from the field of technical (semi-)autonomous systems.
Learning Content
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

Literature
The slides are available as a PDF

Related Literature
- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Further (specific) literature on individual topics will be given in the lecture.
7.220 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 - Werkzeugmaschinen und Handhabungstechnik

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**Competence Certificate**

Written exam (120 minutes)

**Prerequisites**

"T-MACH-109055 - Werkzeugmaschinen und Handhabungstechnik" must not be commenced.

**Below you will find excerpts from events regarding this course:**

**Machine Tools and Industrial Handling**

2149902, WS 18/19, 6 SWS, Open in study portal

**Description**

**Media:**

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

**Notes**

Lectures on Mondays and Wednesdays, tutorial on Thursdays. The tutorial dates will be announced in the first lecture.

**Learning 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

**Annotation**

None
Workload
MACH:
regular attendance: 63 hours
self-study: 177 hours
Wiling:/TVWL
regular attendance: 63 hours
self-study: 207 hours
7.221 Course: Management Accounting 1 [T-WIWI-102800]

**Responsible:** Prof. Dr. Marcus Wouters

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101498 - Controlling (Management Accounting)

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**Übung zu Management Accounting 1**

2 SWS | Practice (Ü) | Riar

**Competence Certificate**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester in combination with a project that runs for several weeks during the semester.

**Prerequisites**
None

Below you will find excerpts from events regarding this course:

**Management Accounting 1**

2579900, SS 2019, 2 SWS, Open in study portal

**Learning 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.

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

**Literature**

- In addition, several papers that will be available on ILIAS.
7 COURSES

7.222 Course: Management Accounting 2 [T-WIWI-102801]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Controlling (Management Accounting)

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Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester in combination with a project that runs for several weeks during the semester.

Prerequisites
None

Recommendation
It is recommended to take part in the course "Management Accounting 1" before this course.

Below you will find excerpts from events regarding this course:

Management Accounting 2
2579902, WS 18/19, 2 SWS, Open in study portal

Learning 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 and customer value propositions.

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.

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

Literature
- In addition, several papers that will be available on ILIAS.
Course: Management of IT-Projects [T-WIWI-102667]

Responsible: Dr. Roland Schätzle
Organisation: KIT Department of Economics and Management
Part of:
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

Type: Prüfungsleistung schriftlich
Credits: 5
Recurrence: Each summer term
Version: 2

Events
| SS 2019 | 2511214 | Management of IT-Projects | 2 SWS | Lecture (V) | Schätzle |
| SS 2019 | 2511215 | Übungen zu Management von Informatik-Projekten | 1 SWS | Practice (Ü) | Schätzle |

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

Prerequisites
None.

Below you will find excerpts from events regarding this course:

Management of IT-Projects
2511214, SS 2019, 2 SWS, Open in study portal

Learning Content
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructure
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Workload
Lecture 30h
Exercise 15h
Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam &1h
Total: 150h
Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004

Further literature is given in each lecture individually.
7.224 Course: Management of Water Resources and River Basins [T-BGU-106597]

**Responsibility:** Dr.-Ing. Uwe Ehret

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-WIWI-101642 - Naturgefahren und Risikomanagement 1
- M-WIWI-101644 - Naturgefahren und Risikomanagement 2
- M-WIWI-104837 - Naturgefahren und Risikomanagement

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**Events**

| SS 2019 | 6224801 | Management of Water Resources and River Basins | 4 SWS | Lecture / Practice (VÜ) | Ehret |

**Competence Certificate**

Course associated assignments, short reports appr. 2 pages each, and final take home exam, report appr. 10 pages and colloquium

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
Course: Managing New Technologies [T-WIWI-102612]

Responsible: Dr. Thomas Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechon)

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<td>3</td>
<td>Each summer term</td>
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Events

| Events  | SS 2019 | 2545003 | Managing New Technologies | 2 SWS | Lecture (V) | Reiß |

Competence Certificate
Written exam 100% following §4, Abs. 2.

Prerequisites
None

Recommendation
None

Annotation
The credit points for T-WIWI-102612 "Management of New Technologies" were reduced to 3 credit points in the 2019 summer semester.

Below you will find excerpts from events regarding this course:

Managing New Technologies
2545003, SS 2019, 2 SWS, Open in study portal

Learning Content
The course provides an overview of the international development of a selected number of key technologies such as biotechnology, nanotechnology, neurotechnologies, converging technologies. Methods for monitoring new technologies including foresight approaches will be presented and the economic and social impacts of new technologies will be discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement
7.226 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 - Fertigungstechnik

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<td>2149657</td>
<td>Manufacturing Technology</td>
<td>6</td>
<td>Lecture / Practice (VÜ)</td>
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**Competence Certificate**

Written Exam (180 min)

**Prerequisites**

none

*Below you will find excerpts from events regarding this course:*

**Manufacturing Technology**

2149657, WS 18/19, 6 SWS, [Open in study portal](https://ilias.studium.kit.edu/)

**Description**

**Media:**

Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

**Learning 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 lecture provides an excursion to an industry company.

**Annotation**

None
Workload
regular attendance: 63 hours
self-study: 177 hours

Literature
Lecture Notes
**7.227 Course: Market Engineering: Information in Institutions [T-WIWI-102640]**

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101409 - Electronic Markets  
- M-WIWI-101411 - Information Engineering  
- M-WIWI-101446 - Market Engineering  
- M-WIWI-101453 - Angewandte strategische Entscheidungen  
- M-WIWI-102754 - Service Economics and Management

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<td>2540460</td>
<td>Market Engineering: Information in Institutions</td>
<td>2</td>
<td>Lecture(V)</td>
<td>Weinhardt, Straub</td>
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<td>SS 2019</td>
<td>2540461</td>
<td>Übungen zu Market Engineering: Information in Institutions</td>
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**Competence Certificate**

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (3), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by max. one grade level (0.3 or 0.4).

**Prerequisites**

None

Below you will find excerpts from events regarding this course:

**Market Engineering: Information in Institutions**

2540460, SS 2019, 2 SWS, Open in study portal  
Lecture (V)

**Description**

The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

**Learning Content**

The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

**Workload**

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

### 7.228 Course: Market Research [T-WIWI-107720]

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101487 - Sales Management
- M-WIWI-101490 - Marketing Management
- M-WIWI-101510 - Cross-Functional Management Accounting
- M-WIWI-101647 - Data Science: Evidence-based Marketing

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<td>Lecture (V)</td>
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<td>SS 2019</td>
<td>2571151</td>
<td>Market Research Tutorial</td>
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**Competence Certificate**

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**

None

**Recommendation**

None

**Annotation**

Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

Below you will find excerpts from events regarding this course:

#### Market Research

**2571150, SS 2019, 2 SWS, [Open in study portal](#)**

**Lecture (V)**

**Learning Content**

Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

**Annotation**

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

**Workload**

The total workload for this course is approximately 135.0 hours.

- Presence time: 30 hours
- Preparation and wrap-up of the course: 45.0 hours
- Exam and exam preparation: 60.0 hours
**Literature**
## Course: Marketing Analytics [T-WIWI-103139]

### Responsible:
Prof. Dr. Martin Klarmann

### Organisation:
KIT Department of Economics and Management

### Part of:
M-WIWI-101647 - Data Science: Evidence-based Marketing

### Type
Prüfungsleistung schriftlich

### Credits
4.5

### Recurrence
Each winter term

### Version
4

### Events
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<td>WS 18/19</td>
<td>2572170</td>
<td>Marketing Analytics</td>
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<td>Übung zu Marketing Analytics</td>
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### Competence Certificate
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation)

### Prerequisites
The prerequisite for taking the course is the successful completion of the course Market Research [2571150].

### Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-107720 - Market Research must have been passed.

### Recommendation
It is strongly recommended to complete the course Market Research prior to taking the Marketing Analytics course.

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

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

Below you will find excerpts from events regarding this course:

### Marketing Analytics

**2572170, WS 18/19, 2 SWS, Open in study portal**

#### Lecture (V)

### Learning Content
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling, structural equation modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

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

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

### Workload
Total workload for 4.5 ECTS: ca. 135 hours
Literature

7.230 Course: Marketing Strategy Business Game [T-WIWI-102835]

**Responsible:** Prof. Dr. Martin Klarmann

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101490 - Marketing Management
- M-WIWI-101510 - Cross-Functional Management Accounting

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**Events**

| SS 2019 | 2571183 | Marketing Strategy Business Game | 1 SWS | Block (B) | Klarmann, Assistenten |

**Competence Certificate**


**Prerequisites**

None

**Recommendation**

None

**Annotation**

Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop.

Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

Below you will find excerpts from events regarding this course:

**Marketing Strategy Business Game**

2571183, SS 2019, 1 SWS, Open in study portal

**Learning Content**

Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups’ companies.

**Annotation**

- Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop. Exception: In summer term 2016 exceptionally two courses can be chosen or, in case one course has already been chosen previously, a second course can be chosen.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.
Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
7.231 Course: Master Thesis [T-WIWI-103142]

**Responsible:** Studiendekan der KIT-Fakultät für Informatik
Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101650 - Modul Masterarbeit

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**Competence Certificate**
see module description

**Prerequisites**
see module description

**Final Thesis**
This course represents a final thesis. The following periods have been supplied:

- **Submission deadline**: 6 months
- **Maximum extension period**: 3 months
- **Correction period**: 8 weeks

This thesis requires confirmation by the examination office.
Course: Material Flow in Logistic Systems [T-MACH-102151]

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

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<td>Each winter term</td>
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**Part of:**  
M-MACH-101263 - Einführung in die Logistik  
M-MACH-101277 - Materialfluss in Logistiksystemen

### 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 Annnotations.

### 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 regarding this course:

**Material flow in logistic systems**  
2117051, WS 18/19, 4 SWS, [Open in study portal](#)

### 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. 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).

**Media:** Presentations, black board, book, video recordings
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

Annotation
none

Workload
Regular attendance: 30 h
Self-study: 100 h
Group work: 50 h

Literature
Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 2009
7.233 Course: Materials and Processes for Body Lightweight Construction in the Automotive Industry [T-MACH-105166]

**Responsible:** Dr. Stefan Kienzle  
Dr. Dieter Steegmüller  

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101284 - Vertiefung der Produktionstechnik

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<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry</td>
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**Competence Certificate**

Oral Exam (20 min)

**Prerequisites**

none

Below you will find excerpts from events regarding this course:

**Materials and Processes for Body Lightweight Construction in the Automotive Industry**

**Description**

**Media:**

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

**Notes**

The lecture is a block course. An application in Ilias is mandatory.

**Learning Content**

The objective of the lecture is to build up an overview of the relevant materials and processes for the production of a lightweight body. This includes both the actual production and the joining for the body. The lecture covers the different lightweight approaches and possible fields of application in the automotive industry. The methods are discussed with practical examples from the automotive industry.

The following topics will be covered:

- lightweight designs
- aluminium and steel for lightweight construction
- fiber-reinforced plastics by the RTM and SMC process
- joining of steel and aluminium (clinching, riveting, welding)
- bonding
- coating
- finishing
- quality assurance
- virtual factory

**Workload**

regular attendance: 21 hours  
self-study: 99 hours
**Course: Mathematical Models and Methods for Production Systems [T-MACH-105189]**

**Responsible:** Prof. Dr.-Ing. Kai Furmans
Marion Rimmele

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101278 – Materialfluss in vernetzten Logistiksystemen

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**Type**
Prüfungsleistung mündlich

**Credits**
6

**Recurrence**
Each winter term

**Version**
1

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<td>Mathematical models and methods for Production Systems</td>
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<td>4 SWS</td>
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<td>Stoll, Rimmele, Furmans</td>
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**Competence Certificate**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**
none

---

**Below you will find excerpts from events regarding this course:**

**Mathematical models and methods for Production Systems**
2117059, WS 18/19, 4 SWS, Open in study portal

**Description**

**Media:**
black board, lecture notes, presentations

**Notes**
lecture language: english

**Learning Content**

- single server systems: $M/M/1$, $M/G/1$: priority rules, model of failures
- networks: open and closed approximations, exact solutions and approximations
- application to flexible manufacturing systems, AGV (automated guided vehicles) - systems
- modeling of control approaches like constant work in process (ConWIP) or kanban
- discrete-time modeling of queuing systems

**Workload**
regular attendance: 42 hours
self-study: 198 hours

**Literature**
Shanthikumar, Buzacott: Stochastic Models of Manufacturing Systems
7.235 Course: Metal Forming [T-MACH-105177]

Responsible: Dr.-Ing. Thomas Herlan

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Vertiefung der Produktionstechnik

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Events

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<td>SS 2019</td>
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<td>Metal Forming</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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</table>

Competence Certificate

Oral Exam (20 min)

Prerequisites

none

Below you will find excerpts from events regarding this course:

Metal Forming

2150681, SS 2019, 2 SWS, Open in study portal

Description

Media:

Lecture notes will be provided in Illias (https://ilias.studium.kit.edu/)

Learning 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

Annotation

None

Workload

regular attendance: 21 hours
self-study: 99 hours
### 7.236 Course: Methods and Models in Transportation Planning [T-BGU-101797]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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<td>Berechnungsverfahren und Modelle in der Verkehrsplanung</td>
<td>2 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Vortisch, Mitarbeiter/innen</td>
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**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
### Course: Methods in Economic Dynamics [T-WIWI-102906]

**Responsible:** Prof. Dr. Ingrid Ott  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101514 - Innovationsökonomik  

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<th>2560240</th>
<th>Methods in Economic Dynamics</th>
<th>SWS</th>
<th>Lecture (V)</th>
<th>Ott, Bälz</th>
</tr>
</thead>
</table>

**Competence Certificate**  
Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

**Prerequisites**  
None

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

Below you will find excerpts from events regarding this course:

**Methods in Economic Dynamics**  
2560240, SS 2019, SWS, [Open in study portal](#)

**Learning Content**  
The workshop offers the possibility to deepen the understanding about different aspects of theoretical modelling of innovation-based growth and induced economic effects. This includes the implementation of formal models in computer algebra systems as well as recording, processing and econometric analysis of related data from relational databases (concerning for example patents or trademarks). Moreover, methods of network theory are discussed.

**Annotation**  
The course has been added summer 2015.

**Workload**  
The total workload for this course is approximately 45 hours.  
Lecture: 15h  
Preparation of lecture/exam: 30h
### 7.238 Course: Microactuators [T-MACH-101910]

**Responsible:** Prof. Dr. Manfred Kohl  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-ETIT-101158 - Sensorik I  
M-ETIT-101159 - Sensorik II  
M-MACH-101287 - Mikrosystemtechnik  
M-MACH-101290 - BioMEMS  
M-MACH-101292 - Mikrooptik

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**Events**  
| SS 2019 | 2142881 | Microactuators | 2 SWS | Lecture (V) | Kohl |

**Competence Certificate**  
oral exam

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

### Microactuators  
2142881, SS 2019, 2 SWS, [Open in study portal](#)

**Description**  
**Media:**  
Script of ppt-slides

**Learning 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:
  
  - Microelectromechanical 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

**Workload**  
lecture time 1.5 h/week  
self preparation: 8.5 h/week
Literature
- Lecture notes
- M. Kohl, Shape Memory Microactuators, M. Kohl, Springer-Verlag Berlin, 2004
Course: Mixed Integer Programming I [T-WIWI-102719]

**Responsible:** Prof. Dr. Oliver Stein

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101473 - Mathematische Optimierung
- M-WIWI-102832 - Operations Research im Supply Chain Management
- M-WIWI-103289 - Stochastische Optimierung

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**Competence Certificate**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

The examination can also be combined with the examination of *Mixed Integer Programming II* [25140]. In this case, the duration of the written examination takes 120 minutes.

**Prerequisites**
None

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-WIWI-102733 - Mixed Integer Programming I and II must not have been started.

**Recommendation**
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

**Annotation**
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).
7.240 Course: Mixed Integer Programming II [T-WIWI-102720]

**Responsible:** Prof. Dr. Oliver Stein

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101473 - Mathematische Optimierung
- M-WIWI-102832 - Operations Research im Supply Chain Management
- M-WIWI-103289 - Stochastische Optimierung

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**Competence Certificate**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

The examination can also be combined with the examination of Mixed Integer Programming I [2550138]. In this case, the duration of the written examination takes 120 minutes.

**Prerequisites**
None

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-WIWI-102733 - Mixed Integer Programming I and II must not have been started.

**Recommendation**
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

**Annotation**
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).
Course: Mobile Machines [T-MACH-105168]

**Responsible:** Prof. Dr.-Ing. Marcus Geimer

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101267 - Mobile Arbeitsmaschinen

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**Events**

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<th>Mobile Machines</th>
<th>4 SWS</th>
<th>Lecture (V)</th>
<th>Geimer, Geiger</th>
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**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 important mobile machines
- selected subsystems and components

**Content:**

- Introduction of the required components and machines
- Basics of the structure of mobile machines
- Practical insight in the development techniques

**Below you will find excerpts from events regarding this course:**
Course: Mobility Services and new Forms of Mobility [T-BGU-103425]

**Responsible:** Dr.-Ing. Martin Kagerbauer

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101064 - Grundlagen des Verkehrswesens
- M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Events**

| SS 2019 | 6232811 | Mobilitätsservices und neue Formen der Mobilität | 2 SWS | Lecture / Practice (VÜ) | Kagerbauer |

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.243 Course: Model Based Application Methods [T-MACH-102199]

- **Responsible:** Dr. Frank Kirschbaum
- **Organisation:** KIT Department of Mechanical Engineering
- **Part of:** M-MACH-101303 - Verbrennungsmotoren II

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<td>4</td>
<td>Each summer term</td>
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**Competence Certificate**

take-home exam, short presentation with oral examination

**Prerequisites**

none
### Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

#### Responsible
Dr. Verena Dorner  
Prof. Dr. Christof Weinhardt

#### Organisation
KIT Department of Economics and Management

#### Part of
- M-WIWI-101448 - Service Management
- M-WIWI-101489 - Strategie, Kommunikation und Datenanalyse
- M-WIWI-101506 - Service Analytics
- M-WIWI-103118 - Data Science: Data-Driven User Modeling

### Events
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#### Type
- Prüfungsleistung schriftlich

#### Credits
4.5

#### Recurrence
Each summer term

#### Version
1

#### Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

#### Prerequisites
None

#### Recommendation
None

#### Annotation
Number of participants limited.

Below you will find excerpts from events regarding this course:

### Modeling and Analyzing Consumer Behavior with R
2540470, SS 2019, 2 SWS, Open in study portal  

#### Learning Content
Students learn the fundamental methods, algorithms and concepts for analysing consumer data. The students deepen their knowledge in working on a case study and computer exercises, especially in the areas of e-commerce and behavioural economics. In addition, students learn to write applications in R and to organize and execute larger data mining and general data analytics projects. Furthermore, students learn methods for evaluating and visualizing data.

The event will focus on the following topics:
1. basic programming concepts in R  
2. data mining with R using established process models such as CRISP-DM  
3. text mining and analysis of online data with R  
4. working on a case study from the area of Consumer and User Analytics  
5. data visualization and evaluation with R

#### Annotation
The course has been added summer term 2015.
Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)
7.245 Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
M-WIWI-102808 - Digital Service Systems in Industry  
M-WIWI-102832 - Operations Research im Supply Chain Management

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**Events**

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<td>WS 18/19</td>
<td>2550490</td>
<td>Modellieren und OR-Software: Fortgeschrittene Themen</td>
<td>3 SWS</td>
<td>Practical course (P)</td>
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</table>

**Competence Certificate**

The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation). The examination is held in the term of the software laboratory and the following term.

**Prerequisites**

None.

**Recommendation**

Basic knowledge as conveyed in the module Introduction to Operations Research is assumed. Successful completion of the course Modeling and OR-Software: Introduction.

**Annotation**

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course. The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

**Below you will find excerpts from events regarding this course:**

**Modellieren und OR-Software: Fortgeschrittene Themen**

2550490, WS 18/19, 3 SWS, [Open in study portal](#)

**Learning 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.

**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 winter term. The planned lectures and courses for the next three years are announced online.

**Workload**

The total workload for this course is approximately 135.0 hours. For further information see German version.
7.246 Course: Modeling Strategic Decision Making [T-WIWI-102803]

**Responsible:** Prof. Dr. Hagen Lindstädt

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101510 - Cross-Functional Management Accounting

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**Competence Certificate**
The course will not be offered anymore from winter term 2016/2017 on. The examination will be offered latest until summer term 2017 (repeaters only).
Written exam 100% following §4, Abs. 2.

**Prerequisites**
None

**Recommendation**
None
7.247 Course: Modelling, Measuring and Managing of Extreme Risks [T-WIWI-102841]

**Responsible:** Prof. Dr. Ute Werner

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101449 - Insurance Management II

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

T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks will be offered latest until summer term 2017 (beginners only).

**Prerequisites**
None

**Recommendation**
None
Course: Morphodynamics [T-BGU-101859]

**Responsible:** Prof. Dr. Franz Nestmann

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-WIWI-101642 - Naturgefahren und Risikomanagement 1
- M-WIWI-101644 - Naturgefahren und Risikomanagement 2
- M-WIWI-104837 - Naturgefahren und Risikomanagement

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**Type**
Prüfungsleistung mündlich

**Credits**
3

**Version**
1

**Competence Certificate**
See German version.

**Prerequisites**
None
### 7.249 Course: Multivariate Statistical Methods [T-WIWI-103124]

**Responsible:** Prof. Dr. Oliver Grothe

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101473 - Mathematische Optimierung
- M-WIWI-101637 - Analytics und Statistik
- M-WIWI-101639 - Ökonometrie und Statistik II
- M-WIWI-103289 - Stochastische Optimierung

**Type**
- Prüfungsleistung schriftlich

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

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**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).

The exam is offered every semester. Re-examinations are offered only for repeaters.

**Prerequisites**

None

**Recommendation**

The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course "Advanced Statistics". Without this, participation in the course is not advised.

Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.
Course: Nanotechnology for Engineers and Natural Scientists [T-MACH-105180]

Responsible: Prof. Dr. Martin Dienwiebel
PD Dr. Hendrik Hölscher
Stefan Walheim

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnologie

Events

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<td>1</td>
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</table>

Competence Certificate
written exam 90 min

Prerequisites
none

Below you will find excerpts from events regarding this course:

Learning Content
1) Introduction into nanotechnology
2) History of scanning probe techniques
3) Scanning tunneling microscopy (STM)
4) Atomic force microscopy (AFM)
5) Dynamic Modes (DFM, ncAFM, MFM, KPFM, ...)
6) Friction force microscopy & nanotribology
7) Nanolithography
8) Other families of the SPM family

Workload
lectures 30 h
self study 30 h
preparation for examination 30 h

Literature
1. Lecture notes, slides, script
7.251 Course: Nanotechnology with Clusterbeams [T-MACH-102080]

Responsible: Dr. Jürgen Gspann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Mikrosystemtechnik
        M-MACH-101294 - Nanotechnologie

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<td>Each winter term</td>
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Competence Certificate
written examination
presence in more than 70% of the lectures
Duration: 1 h

aids: none

Prerequisites
none
7.252 Course: Nanotribology and -Mechanics [T-MACH-102167]

**Responsible:** Prof. Dr. Martin Dienwiebel
PD Dr. Hendrik Hölscher

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101291 - Mikrofertigung
- M-MACH-101294 - Nanotechnologie

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**Events**

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<td>Block lecture (BV)</td>
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<td>Nanotribology and -Mechanics</td>
<td>Lecture / Practice (VÜ)</td>
<td>2 SWS</td>
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**Competence Certificate**
presentation (40%) and colloquium (30 min, 60%)

no tools or reference materials

**Prerequisites**
none

**Recommendation**
preliminary knowledge in mathematics and physics

*Below you will find excerpts from events regarding this course:*

**V Nanotribology and -Mechanics**
2182712, WS 18/19, 2 SWS, Open in study portal

**Block lecture (BV)**

**Learning Content**
Part 1: Basics:
- Nanotechnology
- Forces at nanometer scale
- contact mechanics models (Hertz, JKR, DMT)
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Atomic-Scale Wear

Part 2: Topical papers

**Workload**
regular attendance: 22,5 hours
preparation for presentation: 22,5 hours
self-study: 75 hours

**Literature**
Lecture notes, slides and copies of articles
Learning Content
Part 1: Basics:
  - Nanotechnology
  - Forces at nanometer scale
  - contact mechanics models (Hertz, JKR, DMT)
  - Experimental methods (SFA, QCM, FFM)
  - Prandtl-Tomlinson model
  - Superlubricity
  - Atomic-Scale Wear

Part 2: Topical papers

Workload
regular attendance: 22.5 hours
preparation for presentation: 22.5 hours
self-study: 75 hours

Literature
Edward L. Wolf
Nanophysics and Nanotechnology, Wiley-VCH, 2006
C. Mathew Mate
Lecture notes, slides and copies of articles
**T 7.253 Course: Nature-Inspired Optimisation Methods [T-WIWI-102679]**

**Responsible:** Dr. rer. nat. Pradyumn Kumar Shukla  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik

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<td>Übungen zu Nature-Inspired Optimization Methods</td>
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**Competence Certificate**

The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called “bonus exam”, 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exercises. The bonus exam may be split into several shorter written tests.

The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

**Prerequisites**

None

Below you will find excerpts from events regarding this course:

**Nature-Inspired Optimization Methods**  
2511106, SS 2019, 2 SWS, Open in study portal

**Learning Content**

Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.
### 7.254 Course: Non- and Semiparametrics [T-WIWI-103126]

**Responsible:** Prof. Dr. Melanie Schienle  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101638 - Ökonometrie und Statistik I  
- M-WIWI-101639 - Ökonometrie und Statistik II

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**Competence Certificate**  
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**  
None

**Recommendation**  
Knowledge of the contents covered by the course "Applied Econometrics" [2520020]

**Annotation**  
The course takes place every second winter semester: 2018/19 then 2020/21
### Course: Nonlinear Optimization I [T-WIWI-102724]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101473 - Mathematische Optimierung

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**Competence Certificate**  
The assessment consists 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 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.

**Modeled Conditions**  
The following conditions have to be fulfilled:  
1. The course T-WIWI-103637 - Nonlinear Optimization I and II must not have been started.

**Annotation**  
Part I and II of the lecture are held consecutively in the same semester.

**Below you will find excerpts from events regarding this course:**

**Nichtlineare Optimierung I**  
2550111, WS 18/19, 2 SWS, Open in study portal

**Learning 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, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:  
- Introduction, examples, and terminology  
- Existence results for optimal points  
- First and second order optimality conditions for unconstrained problems  
- Optimality conditions for unconstrained convex problems  
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.  
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.
Annotation
Part I and II of the lecture are held consecutively in the same semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
Course: Nonlinear Optimization I and II [T-WIWI-103637]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101473 - Mathematische Optimierung

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**Competence Certificate**

The assessment consists 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.

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-WIWI-102724 - Nonlinear Optimization I must not have been started.
2. The course T-WIWI-102725 - Nonlinear Optimization II must not have been started.

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.

**Below you will find excerpts from events regarding this course:**

Nicthlineare Optimierung I  
2550111, WS 18/19, 2 SWS, Open in study portal  
Lecture (V)

**Learning 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, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality conditions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.
**Annotation**
Part I and II of the lecture are held consecutively in the same semester.

**Literature**

**Elective literature:**


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**Nichtlineare Optimierung II**
2550113, WS 18/19, 2 SWS, [Open in study portal](#)

**Lecture (V)**

**Learning 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, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of 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 for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Annotation**
Part I and II of the lecture are held consecutively in the same semester.

**Literature**

**Elective literature:**

**Course: Nonlinear Optimization II [T-WIWI-102725]**

**Responsible:** Prof. Dr. Oliver Stein

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101473 - Mathematische Optimierung

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**Competence Certificate**

The assessment consists 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* [2550111]. In this case, the duration of the written exam takes 120 minutes.

**Prerequisites**

None.

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-WIWI-103637 - Nonlinear Optimization I and II must not have been started.

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.

*Below you will find excerpts from events regarding this course:*

**V**

**Nichtlineare Optimierung II**

2550113, WS 18/19, 2 SWS, [Open in study portal]

**Lecture (V)**

**Learning 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, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of 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 for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.
Literature

Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
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 - Mikrosystemtechnik  
- M-MACH-101294 - Nanotechnologie  
- M-MACH-101295 - Optoelektronik und Optische Kommunikationstechnik  

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**Competence Certificate**

oral exam (30 Min.)

**Prerequisites**

none

*Below you will find excerpts from events regarding this course:*

**Novel actuators and sensors**

2141865, WS 18/19, 2 SWS, Lecture (V)

**Description**

**Media:**
Script / script of ppt foils (part 2)

**Learning Content**

**Contents:**  
- Basic knowledge in the material science of actuator and sensor principles  
- Layout and design optimization  
- Fabrication technologies  
- Selected developments  
- Applications

**Index:** The lecture includes amongst others the following topics:

- Piezo actuators  
- Magnetostrictive actuators  
- Shape memory actuators  
- Electro-/magnetorheological actuators  
- Sensors: Concepts, materials, fabrication  
- Micromechanical sensors: Pressure, force, inertia sensors  
- Temperature sensors  
- Micro sensors for bio analytics  
- Mechano-magnetic sensors

The lecture addresses students in the fields of mechanical engineering, mechatronics and information technology, materials science and engineering, electrical engineering and economic sciences. A comprehensive introduction is given in the basics and current developments on the macroscopic length scale.

The lecture is core subject of the major course "Actuators and Sensors" of the specialization "Mechatronics and Microsystems Technology" in Mechanical Engineering.
Workload

Work Lecture:

- time of attendance: 21 hours
- Self-study: 99 hours

Literature

- Lecture notes
- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007
## 7.259 Course: Operation Methods for Earthmoving [T-BGU-101801]

**Responsible:** Dr.-Ing. Heinrich Schlick  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101110 - Verfahrenstechnik im Baubetrieb

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### Events

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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
Course: Operation Methods for Foundation and Marine Construction [T-BGU-101832]

**Responsible:** Dr.-Ing. Harald Schneider  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101110 - Verfahrenstechnik im Baubetrieb

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**Events**  
WS 18/19 | 6241904 | Tiefbau | 1 SWS | Lecture (V) | Haghsheno, Schneider

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
Course: Operations Research in Health Care Management [T-WIWI-102884]

**Responsible:** Prof. Dr. Stefan Nickel

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-102805 - Service Operations

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**Competence Certificate**
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**
None

**Recommendation**
Basic knowledge as conveyed in the module *Introduction to Operations Research* [WI1OR] is assumed.

**Annotation**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.
## 7.262 Course: Operations Research in Supply Chain Management [T-WIWI-102715]

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101473 - Mathematische Optimierung  
- M-WIWI-102805 - Service Operations  
- M-WIWI-102832 - Operations Research im Supply Chain Management  
- M-WIWI-103289 - Stochastische Optimierung

### Events

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**Competence Certificate**  
The assessment is a 120 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**  
None

**Recommendation**  
Basic knowledge as conveyed in the module *Introduction to Operations Research* and in the lectures *Facility Location and Strategic SCM, Tactical and operational SCM* is assumed.

**Annotation**  
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at [http://dol.ior.kit.edu/english/Courses.php](http://dol.ior.kit.edu/english/Courses.php).

Below you will find excerpts from events regarding this course:

### Operations Research in Supply Chain Management  
2550480, SS 2019, 2 SWS, [Open in study portal](#)  

**Lecture (V)**

**Learning Content**  
Supply Chain Management constitutes a general tool for logistics process planning in supply networks. To an increasing degree quantitative decision support is provided by methods and models from Operations Research. The lecture "OR in Supply Chain Management" conveys concepts and approaches for solving practical problems and presents an insight to current research topics. The lecture's focus is set on modeling and solution methods for applications originating in different domains of a supply chain. The emphasis is put on mathematical methods like mixed integer programming, valid inequalities or column generation, and the derivation of optimal solution strategies.

In form and content, the lecture addresses all levels of Supply Chain Management: After a short introduction, the tactical and operational level will be discussed with regard to inventory models, scheduling as well as cutting and packing. The strategic level will be discussed in terms of layout planning. Another main focus of the lecture is the application of methods from online optimization. This optimization discipline has gained more and more importance in the optimization of supply chains over the several past years due to an increasing amount of dynamic data flows.

**Annotation**  
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at [http://dol.ior.kit.edu/english/Courses.php](http://dol.ior.kit.edu/english/Courses.php).
Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Dyckhoff, H.; Finke, U.: Cutting and Packing in Production and Distribution - A Typology and Bibliography, Physica-Verlag, 1992
### 7.263 Course: Optical Transmitters and Receivers [T-ETIT-100639]

**Responsible:** Prof. Dr. Wolfgang Freude  
**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:** M-MACH-101295 - Optoelektronik und Optische Kommunikationstechnik

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**Prerequisites**  
none
7.264 Course: Optical Waveguides and Fibers [T-ETIT-101945]

**Responsible:** Prof. Dr.-Ing. Christian Koos

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:**
- M-MACH-101292 - Mikrooptik
- M-MACH-101295 - Optoelektronik und Optische Kommunikationstechnik

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**Prerequisites**
none
### 7.265 Course: Optimization under Uncertainty [T-WIWI-106545]

**Responsible:** Prof. Dr. Steffen Rebennack  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103289 - Stochastische Optimierung

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**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.
7.266 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 - Mikrosystemtechnik

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Prerequisites
none
7.267 Course: P&C Insurance Simulation Game [T-WIWI-102797]

**Responsible:** Prof. Dr. Ute Werner

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101449 - Insurance Management II

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**Competence Certificate**
T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on.

**Prerequisites**
None

**Recommendation**
See German version.
### 7.268 Course: Panel Data [T-WIWI-103127]

**Responsible:** Dr. Wolf-Dieter Heller  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101638 - Ökonometrie und Statistik I  
- M-WIWI-101639 - Ökonometrie und Statistik II

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**Prerequisites**

None
Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.
Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).
### 7.270 Course: Patent Law [T-INFO-101310]

| Responsible: | Prof. Dr. Thomas Dreier |
| Organisation: | KIT Department of Informatics |
| Part of: | M-INFO-101215 - Recht des Geistigen Eigentums |

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7.271 Course: Personalization and Services [T-WIWI-102848]

Responsible: Dr.-Ing. Andreas Sonnenbichler
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101410 - Business & Service Engineering
M-WIWI-101470 - Data Science: Advanced CRM

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Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events regarding this course:

**Personalization & Services**
2540533, WS 18/19, 2 SWS, [Open in study portal]

Lecture (V)

Learning Content
- Personalization of Services and Applications
- User Modeling
- User Profiles
- Authentication
- Authorization
- Applications in e-Commerce and for internet-based Services
- Personalized Web Search
- Privacy
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

Literature
The course follows latest scientific papers. References to these papers are listed at the end of each course unit.
### 7.272 Course: PH APL-ING-TL01 [T-WIWI-106291]

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7.273 Course: PH APL-ING-TL02 [T-WIWI-106292]

**Organisation:** University

**Part of:** M-WIWI-101404 - Außerplanmäßiges Ingenieurmodul

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7.274 Course: PH APL-ING-TL03 [T-WIWI-106293]

**Organisation:** University

**Part of:** M-WIWI-101404 - Außerplanmäßiges Ingenieurmodul

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7.275 Course: PH APL-ING-TL04 ub [T-WIWI-106294]

Organisation: University
Part of: M-WIWI-101404 - Außerplanmäßiges Ingenieurmodul

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7.276 Course: PH APL-ING-TL05 ub [T-WIWI-106295]

**Organisation:** University

**Part of:** M-WIWI-101404 - Außerplanmäßiges Ingenieurmodul

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**Course: PH APL-ING-TL06 ub [T-WIWI-106296]**

**Organisation:** University

**Part of:** M-WIWI-101404 - Außerplanmäßiges Ingenieurmodul
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**Course: PH APL-ING-TL07 [T-WIWI-108384]**

**Organisation:** University

**Part of:** M-WIWI-101404 - Außerplanmäßiges Ingenieurmodul
7.279 Course: Photovoltaic System Design [T-ETIT-100724]

**Responsible:** Robin Grab  
N.N.

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:** M-ETIT-101164 - Erzeugung und Übertragung regenerativer Energie

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**Prerequisites**

none
Course: Physical Basics of Laser Technology [T-MACH-102102]

**Responsible:** Dr.-Ing. Johannes Schneider

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Type**
Prüfungsleistung mündlich

**Credits**
5

**Recurrence**
Each winter term

**Version**
3

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### Events

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<td>Lecture / Practice (VÜ)</td>
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### 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]

### Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105164 - Laser in Automotive Engineering must not have been started.

### Recommendation
Basic knowledge of physics, chemistry and material science

Below you will find excerpts from events regarding this course:

---

### Physical basics of laser technology

**2181612, WS 18/19, 3 SWS, Open in study portal**

**Lecture / Practice (VÜ)**

---

**Description**

**Media:**
lecture notes via ILIAS

**Learning 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
- safety aspects

The lecture is complemented by a tutorial.
Annotation
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.

Workload
regular attendance: 33.5 hours
self-study: 146.5 hours

Literature
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 - Mikrosystemtechnik  
M-MACH-101291 - Mikrofertigung

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**Competence Certificate**  
written exam 90 min

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

**Learning 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.

**Workload**

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises 2142891)  
self-study: 97,5 hours and 49 hours (excerises 2142891)
Literature

- Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
- Harris, Moderne Physik, Pearson Verlag, 2013
**7.282 Course: Planning and Management of Industrial Plants [T-WIWI-102631]**

**Responsible:** Prof. Dr. Frank Schultmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101471 - Industrielle Produktion II

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**Competence Certificate**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Learning Content**
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling. During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

**Workload**
Total effort required will account for approximately 165h (5.5 credits).

**Literature**
will be announced in the course
7.283 Course: PLM for Product Development in Mechatronics [T-MACH-102181]

Responsible: Prof. Dr.-Ing. Martin Eigner
Organisation: KIT Department of Mechanical Engineering

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

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<td>SWS</td>
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Competence Certificate
Oral examination 20 min.

Prerequisites
none

Below you will find excerpts from events regarding this course:

PLM for product development in mechatronics
2122376, SS 2019, SWS, Open in study portal

Workload
The total workload for this course is approximately 120 hours. For further information see German version.
7.284 Course: PLM-CAD Workshop [T-MACH-102153]

**Responsible:** Prof. Dr.-Ing. Jivka Ovtcharova

**Organisation:** KIT Department of Mechanical Engineering

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

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<td>4 SWS Practical course (P) Ovtcharova, Mitarbeiter</td>
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**Competence Certificate**
Alternative exam assessment (graded)

**Prerequisites**
None

**Annotation**
Number of participants is limited, compulsory attendance
7 COURSES
Course: Polymer Engineering I [T-MACH-102137]

7.285 Course: Polymer Engineering I [T-MACH-102137]

Responsible: Prof. Dr.-Ing. Peter Elsner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101268 - Spezielle Werkstoffkunde

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Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

Below you will find excerpts from events regarding this course:

Polymer Engineering I
2173590, WS 18/19, 2 SWS, Open in study portal

Learning Content
1. Economical aspects of polymers
2. Introduction of mechanical, chemical end electrical properties
3. Processing of polymers (introduction)
4. Material science of polymers
5. Synthesis

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
Recommended literature and selected official lecture notes are provided in the lecture
7.286 Course: Polymerengineering II [T-MACH-102138]

**Responsible:** Prof. Dr.-Ing. Peter Elsner

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Competence Certificate**
Oral exam, about 25 minutes

**Prerequisites**
none

**Recommendation**
Knowledge in Polymerengineering I

Below you will find excerpts from events regarding this course:

**Polymer Engineering II**
2174596, SS 2019, 2 SWS, Open in study portal

**Learning 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

**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**
Recommended literature and selected official lecture notes are provided in the lecture.
7.287 Course: Polymers in MEMS A: Chemistry, Synthesis and Applications [T-MACH-102192]

**Responsible:** Dr.-Ing. Bastian Rapp

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101291 - Mikrofertigung

**Type**  |  Prüfungsleistung mündlich  |  **Credits**  |  3  |  **Recurrence**  |  Each winter term  |  **Version**  |  1
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</table>

**Competence Certificate**

Oral examination

**Prerequisites**

none

*Below you will find excerpts from events regarding this course:*

**Polymers in MEMS A: Chemistry, Synthesis and Applications**

2141853, WS 18/19, Open in study portal

**Description**

**Media:**

The lecture slides will be given out as scriptum during each lecture course.
Learning Content

We all come in contact with numerous polymeric products in everyday life. From water bottles to packaging to the cover of the iPad, many things are made of polymers. Polymers are also important materials for modern microelectromechanical systems (MEMS) allowing cost effective mass market compatible products, e.g., in the life sciences or diagnostics. But polymers are not just cost-effective replacements for more expensive classical materials in MEMS (such as, e.g., silicon) – some polymers have intrinsic properties that make them ideal materials for sensors, actuators or templates for biology and chemistry in MEMS.

This lecture will introduce the basics of organic chemistry required for understanding what polymers are, how they are manufactured and which mechanisms are responsible for their unique properties. The lecture will highlight (in the context of MEMS but also in a wider scope) where and why polymers are applied with a strong focus on their chemical and physical properties (and on their synthesis).

Some of the topics covered are:

- What is the basic chemistry of polymers? What are monomers, what are macromolecules and how are they formed?
- How are polymers produced on industrial scale – but also on the laboratory scale? Numerous examples of how to make (commonly and lesser known) polymers will be discussed including materials such as Plexiglas.
- Why are polymers so important for biochemistry and tissue engineering?
- How do photoresists work and why do some polymers contract when exposed to light?
- What are high-performance polymers and why do they have such a wide application range, e.g., in implants?
- What polymers fuel the household 3D printing community and what materials do 3D printers such as, e.g., the RepRap work with?
- How does 3D printing and rapid prototyping work and which polymers can be employed for which techniques?
- Why does silicone always smell like vinegar and why is this material so important for modern day microfluidics? How do you build fluid-logic devices using silicone?
- How do shape memory polymers remember their shape?
- What are polymer foams and why are they not only important for heat insulation but also for organic chemistry?
- How do glues work? Why are there two-component glues, what is superglue and how can you make glue from potatoes?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu). Preregistration is not necessary.

The examination will be held in oral form at the end of the lecture. The lecture can be chosen as "Nebenfach" or part of a "Hauptfach". The second lecture of the lecture series "Polymers in MEMS B – Physics, manufacturing and applications" (which is also held in winter semester) can be combined with this lecture as part of a "Hauptfach". In summer semester, the third part of the lecture series "Polymers in MEMS C – Biopolymers, Biopolymers and applications" will be given which may be combined with lectures A and B to form a complete "Hauptfach".

Annotation

For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu). Preregistration is not necessary.

Workload

- lecture: 15 * 1.5 h (22 h)
- lecture preparation (before and after lecture): 15 * 2 h (30 h)
- preparation of final exam: 70 h
7.288 Course: Polymers in MEMS B: Physics, Microstructuring and Applications [T-MACH-102191]

Responsible: Dr. Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Mikrofertigung

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Competence Certificate
Oral examination

Prerequisites
none

Below you will find excerpts from events regarding this course:

**Polymers in MEMS B: Physics, Microstructuring and Applications**

2141854, WS 18/19, 2 SWS, Open in study portal

Description
Media:
The lecture slides will be given out as scriptum during each lecture course.
Learning Content
We all come in contact with numerous polymeric products in everyday life. From water bottles to packaging to the cover of the iPad, many things are made of polymers. Polymers are also important materials for modern microelectromechanical systems (MEMS) allowing cost effective mass market compatible products, e.g., in the life sciences or diagnostics. But polymers are not just cost-effective replacements for more expensive classical materials in MEMS (such as, e.g., silicon) – some polymers have intrinsic properties that make them ideal materials for sensors, actuators or templates for biology and chemistry in MEMS.

This lecture will introduce the basics of physics and material science required for the understanding of the mechanical behavior seen from the engineers view. Micro and nanostructuring of polymers allows the fabrication of micro parts fulfilling their tasks in mostly invisible different applications. But also the fabrication of polymer parts with functional surfaces inspired from Bionics will be presented in this lesson. The lesson will give further an overview over the polymer based structuring processes and will underline the importance by a number of applications e.g. photonic structures or Lotus-like structures.

Some of the topics covered are:

- How can polymers described from the view of engineers?
- What are the differences between polymers and metals?
- Rheology of polymer melts – How does polymer melts flow?
- How can polymers be formed and demolded?
- Which structuring processes (replication) processes are available?
- How does stress influence molded parts (e.g. the deformation of a CD in a hot car)
- Shrinkage of polymers – which precision is achievable
- Gluing or welding – How can polymers be assembled?
- Simulation of replication processes
- Characterization of polymers – which properties can be measured?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

The examination will be held in oral form at the end of the lecture. The lecture can be chosen as "Nebenfach" or part of a "Hauptfach". The second lecture of the lecture series "Polymers in MEMS A – Chemistry, synthesis and applications " (which is also held in winter semester) can be combined with this lecture as part of a "Hauptfach". In summer semester, the third part of the lecture series "Polymers in MEMS C – Biopolymers, Biopolymers and applications" will be given which may be combined with lectures A and B to form a complete "Hauptfach".

Annotation
For further details, please contact the lecturer, PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

Workload

- lecture: 15 * 1.5 h (22 h)
- lecture preparation (before and after lecture): 15 * 2 h (30 h)
- preparation of final exam: 70 h
7.289 Course: Polymers in MEMS C: Biopolymers and Bioplastics [T-MACH-102200]

 Responsible: Dr.-Ing. Bastian Rapp
Dr.Ing. Matthias Worgull

 Organisation: KIT Department of Mechanical Engineering

 Part of: M-MACH-101291 - Mikrofertigung

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 Competence Certificate
Oral examination

 Prerequisites
none

Below you will find excerpts from events regarding this course:

V Polymers in MEMS C - Biopolymers and Bioplastics
2142855, SS 2019, 2 SWS, Open in study portal

Block lecture (BV)
Learning Content
Polymers are ubiquitous in everyday life: from packaging materials all the way to specialty products in medicine and medical engineering. Today it is difficult to find a product which does not (at least in parts) consist of polymeric materials. The question of how these materials can be improved with respect to their disposal and consumption of (natural) resources during manufacturing is often raised. Today polymers must be fully recycled in Germany and many other countries due to the fact that they do not (or only very slowly) decompose in nature. Furthermore significant reductions of crude oil consumption during synthesis are of increasing importance in order to improve the sustainability of this class of materials. With respect to disposal polymers which do not have to be disposed by combustion but rather allow natural decomposition (composting) are of increasing interest. Polymers from renewable sources are also of interest for modern microelectromechanical systems (MEMS) especially if the systems designed are intended as single-use products.

This lecture will introduce the most important classes of these so-called biopolymers and bioplastics. It will also discuss and highlight polymers which are created from naturally created analogues (e.g. via fermentation) to petrochemical polymer precursors and describe their technical processing. Numerous examples from MEMS as well as everyday life will be given.

Some of the topics covered are:

- What are biopolyurethanes and how can you produce them from castor oil?
- What are "natural glues" and how are they different from chemical glues?
- How do you make tires from natural rubbers?
- What are the two most important polymers for life on earth?
- How can you make polymers from potatoes?
- Can wood be formed by injection molding?
- How do you make buttons from milk?
- Can you play music on biopolymers?
- Where and how do you use polymers for tissue engineering?
- How can you built LEGO with DNA?

The lecture will be given in German language unless non-German speaking students attend. In this case, the lecture will be given in English (with some German translations of technical vocabulary). The lecture slides are in English language and will be handed out for taking notes. Additional literature is not required.

For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu) and PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

Annotation
For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu) and PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is not necessary.

Workload
- lecture: 15 * 1.5 h (22 h)
- lecture preparation (before and after lecture): 15 * 2 h (30 h)

preparation of final exam: 70 h

Literature
Additional literature is not required.
7.290 Course: Portfolio and Asset Liability Management [T-WIWI-103128]

**Responsibility:** Dr. Mher Safarian

**Course:** Portfolio and Asset Liability Management [T-WIWI-103128]

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101639 - Ökonometrie und Statistik II

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**Competence Certificate**

The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Prerequisites**

None

**Below you will find excerpts from events regarding this course:**

**Portfolio and Asset Liability Management**

**2520357, SS 2019, 2 SWS, Open in study portal**

**Lecture (V)**

**Description**

Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

**Learning Content**

Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

**Workload**

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

**Literature**

To be announced in lecture.

**Elective literature:**

To be announced in lecture.
7.291 Course: Power Network [T-ETIT-100830]

**Responsible:** Prof. Dr.-Ing. Thomas Leibfried

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:** M-ETIT-101164 - Erzeugung und Übertragung regenerativer Energie

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### 7.292 Course: Power Transmission and Power Network Control [T-ETIT-101941]

**Responsible:** Prof. Dr.-Ing. Thomas Leibfried  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** M-ETIT-101164 - Erzeugung und Übertragung regenerativer Energie

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#### Prerequisites

none
Course: Practical Course Polymers in MEMS [T-MACH-105556]

**Responsible:** Dr.-Ing. Bastian Rapp  
Dr.Ing. Matthias Worgull

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101291 - Mikrofertigung

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**Competence Certificate**
The practical course will close with an oral examination. There will be only passed and failed results, no grades.

**Prerequisites**

none

*Below you will find excerpts from events regarding this course:*

**Practical Course Polymers in MEMS**

2142856, SS 2019, 2 SWS, Open in study portal

**Description**

**Media:**

descriptions of the experiments

**Learning Content**

This practical course complements the lectures "Polymers in MEMS A", "Polymers in MEMS B" and "Polymers in MEMS C" and will allow students to gain a deeper understanding of polymers and their processing. During the course of this practical course, various polymers will be synthesized and molded into components suitable for microelectromechanical systems (MEMS) applications. The aim of the course is to bring a polymer all the way from synthesis to application.

The practical course will be given in German language unless non-German speaking students attend. In this case, the course will be given in English (with some German translations of technical vocabulary). Lecture notes for the experiments are in English language and will be handed out to the students. The practical course will be held "en block" at the end of the semester (presumably beginning of October).

For further details, please contact the lecturer, Dr. Ing. Bastian E. Rapp (bastian.rapp@kit.edu) and PD Dr.-Ing. Matthias Worgull (matthias.worgull@kit.edu). Preregistration is mandatory. The number of participants is limited to 5 students.

**Workload**

- practical course: 3 * 8 h (24 h)
- experiment preparation (before and after lecture): 30 h

Preparation of final exam: 66 h

**Literature**

Scripts of the corresponding lectures, further literature as named there.
7.294 Course: Practical Course Technical Ceramics [T-MACH-105178]

**Responsible:** Dr.-Ing. Rainer Oberacker

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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<td>Each winter term</td>
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</table>

**Competence Certificate**
Colloquium and laboratory report for the respective experiments.

**Prerequisites**
none

*Below you will find excerpts from events regarding this course:*

**Practical Course Technical Ceramics**
2125751, WS 18/19, 2 SWS, [Open in study portal](#)

**Practical course (P)**

**Learning Content**
Based on alumina as a model material, major test methods for the characterization of raw materials, intermediate and final products are practically applied. Topics:

- powder characterization
- Shaping of powder compacts
- sintering
- microstructural characterization
- mechanical testing

On the basis of short descriptions of the methods, the students prepare themselves, carry out the experiments and write a laboratory report.

**Workload**
regular attendance: 30 hours
self-study: 90 hours

**Literature**

Richerson, D. R.: Modern Ceramic Engineering, CRC Taylor & Francis, 2006
7.295 Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

Responsible: Prof. Dr. Wolf Fichtner
Prof. Dr. Alexander Mädche
Prof. Dr. Stefan Nickel
Prof. Dr. Gerhard Satzger
Prof. Dr. York Sure-Vetter
Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102808 - Digital Service Systems in Industry

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<td>2540554</td>
<td>Practical Seminar: Information Systems &amp; Service Design</td>
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<tr>
<td>3 SWS</td>
<td>Lecture (V)</td>
<td>Mädche</td>
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Competence Certificate
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Recommendation
None

Annotation
New course title starting summer term 2017: "Practical Seminar Digital Service Systems". The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

Below you will find excerpts from events regarding this course:

V Practical Seminar: Information Systems & Service Design
2540554, SS 2019, 3 SWS, Open in study portal

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: "The destiny of computers – like other mass technologies like electricity, paper, and running water– is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes." Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.
Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes
7.296 Course: Practical Seminar Service Innovation [T-WIWI-102799]

**Responsible:** Prof. Dr. Gerhard Satzger

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-102806 - Service Innovation, Design & Engineering

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**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 (such as a survey or an implementation of an application) is part of the course. Please examine the course description for the particular tasks.

The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class).

**Prerequisites**
None

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course **T-WIWI-105774 - Practical Seminar: Digital Service Design** must not have been started.

**Recommendation**
Knowledge of Service Innovation Methods is assumed. Therefore it is recommended to attend the course Service Innovation [2540468] beforehand.

**Annotation**
Due to the project work, the number of participants is limited and participation requires knowledge about models, concepts and approaches that are taught in the Service Innovation lecture. Having taken the Service Innovation lecture or demonstrating equivalent knowledge is a prerequisite for participating in this Practical Seminar. Details for registration will be announced on the web pages for this course.

The seminar is not offered regularly.
7.297 Course: Practical Seminar: Advanced Analytics [T-WIWI-108765]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103118 - Data Science: Data-Driven User Modeling

Competence Certificate
The assessment consists of practical work in the field of crowd analytics, a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-106214 - Practical Seminar: Crowd Analytics must not have been started.

Recommendation
At least one module offered by the institute should have been chosen before attending this seminar.

Annotation
The course is held in English. The course is not offered regularly.
7.298 Course: Practical Seminar: Data-Driven Information Systems [T-WWI-106207]

**Responsible:** Prof. Dr. Alexander Mädche  
Prof. Dr. Thomas Setzer  
Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WWI-103117 - Data Science: Data-Driven Information Systems

**Type**  
Prüfungsleistung anderer Art

**Credits**  
4,5

**Recurrence**  
Each term

**Version**  
1

**Competence Certificate**  
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

**Prerequisites**  
None

**Recommendation**  
At least one module offered by the institute should have been chosen before attending this seminar.

**Annotation**  
The course is held in English. The course is not offered regularly.
7.299 Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-102805 - Service Operations

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<td>2550498</td>
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**Competence Certificate**

The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

**Prerequisites**

None.

**Recommendation**

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

**Annotation**

The credits have been reduced to 4,5 starting summer term 2016.  
The lecture is offered every term.  
The planned lectures and courses for the next three years are announced online.

_Below you will find excerpts from events regarding this course:_

**Practical seminar: Health Care Management**  
2550498, SS 2019, 5 SWS, [Open in study portal](#)

**Learning Content**

Processes in a hospital are often grown historically ("We have always done it this way"), so that there has not been the need to analyze processes until reforms of the health system have put increasing pressure on hospitals. Consequently, nowadays hospitals look for possibilities to improve their processes. The students are confronted with case studies and are asked to develop a solution. Therefore they have to collect and analyze relevant data, processes and structures. When developing the solution the students have to bear in mind that besides the economic efficiency also the quality of care and patient satisfaction (e.g. measured in waiting time) may not be neglected in the health care sector.

**Annotation**

The lecture is offered every term.  
The planned lectures and courses for the next three years are announced online.

**Workload**

The total workload for this course is approximately 135 hours. For further information see German version.

**Literature**

**Elective literature:**

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007  
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008  
7.300 Course: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]

**Responsible:** Prof. Dr. Alexander Mädche  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-102806 - Service Innovation, Design & Engineering  
M-WIWI-104068 - Information Systems in Organizations  
M-WIWI-104080 - Designing Interactive Information Systems

### Events

| SS 2019 | 2540554 | Practical Seminar: Information Systems & Service Design | 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.

### Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-WIWI-102799 - Practical Seminar Service Innovation must not have been started.
2. The course T-WIWI-105774 - Practical Seminar: Digital Service Design must not have been started.

### Recommendation

Attending the course „Digital Service Design“ is recommended, but not mandatory.

### Annotation

The course is held in English.

**Below you will find excerpts from events regarding this course:**

### Practical Seminar: Information Systems & Service Design

2540554, SS 2019, 3 SWS, Open in study portal

**Lecture (V)**

**Description**

Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: "The destiny of computers – like other mass technologies like electricity, paper, and running water– is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes." Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.
Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes
### 7.301 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 - Mikrosystemtechnik  
- M-MACH-101290 - BioMEMS  
- M-MACH-101291 - Mikrofertigung  
- M-MACH-101292 - Mikrooptik  
- M-MACH-101294 - Nanotechnologie

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<td>2 SWS</td>
<td>Practical course (P)</td>
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<td>WS 18/19</td>
<td>2143877</td>
<td>Introduction to Microsystem Technology - Practical Course</td>
<td>2 SWS</td>
<td>Practical course (P)</td>
<td>Last</td>
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<tr>
<td>SS 2019</td>
<td>2143875</td>
<td>Introduction to Microsystem Technology - Practical Course</td>
<td>2 SWS</td>
<td>Practical course (P)</td>
<td>Last</td>
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<tr>
<td>SS 2019</td>
<td>2143877</td>
<td>Introduction to Microsystem Technology - Practical Course</td>
<td>2 SWS</td>
<td>Practical course (P)</td>
<td>Last</td>
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</table>

**Competence Certificate**  
The assessment consists of a written exam

**Prerequisites**  
none

Below you will find excerpts from events regarding this course:

**Introduction to Microsystem Technology - Practical Course**  
2143875, WS 18/19, 2 SWS, [Open in study portal](#)  
Practical course (P)

**Learning Content**  
In the practical training includes nine experiments:  
1. Hot embossing of plastics micro structures  
2. Micro electroforming  
4. UV-lithography  
5. Optical waveguides  
6. Capillary electrophoresis on a chip  
7. SAW gas sensor  
8. Metrology  
9. Atomic force microscopy  
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

**Workload**  
Time of attendance: 21 h + 2 h exam  
Privat studies: 5 h preparing experiments + 10 h preparing the exam
Introduction to Microsystem Technology - Practical Course
2143877, WS 18/19, 2 SWS, Open in study portal

Learning Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
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.

Workload
Time of attendance: 21 h + 2 h exam
Privat studies: 5 h preparing experiments + 10 h preparing the exam

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Introduction to Microsystem Technology - Practical Course
2143875, SS 2019, 2 SWS, Open in study portal

Learning Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
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.

Workload
Time of attendance: 21 h + 2 h exam
Privat studies: 5 h preparing experiments + 10 h preparing the exam

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Introduction to Microsystem Technology - Practical Course
2143877, SS 2019, 2 SWS, Open in study portal

Learning Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
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.

Workload
Time of attendance: 21 h + 2 h exam
Privat studies: 5 h preparing experiments + 10 h preparing the exam
7.302 Course: Predictive Mechanism and Market Design [T-WIWI-102862]

**Responsible:** Prof. Dr. Johannes Philipp Reiß  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101453 - Angewandte strategische Entscheidungen  
- M-WIWI-101505 - Experimentelle Wirtschaftsforschung

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**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Annotation**
The course is given every second fall term, e.g., WS2017/18, WS2019/20, ...
The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.
7.303 Course: Price Management [T-WIWI-105946]

Responsiable: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101409 - Electronic Markets

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<td>4,5</td>
<td>Each summer term</td>
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Competence Certificate
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The lecture is offered for the first time in summer term 2016.
7 COURSES

Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

7.304 Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

**Responsible:** Prof. Dr. Martin Klarmann
Mark Schröder

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101487 - Sales Management

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**Events**

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**Competence Certificate**


**Prerequisites**

None

**Recommendation**

None

**Annotation**

Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.

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

Please note that only one of the following courses can be chosen in the Sales Management module: Country Manager Simulation, Case Studies in Sales and Pricing, Price Negotiation and Sales Presentations or Digital Marketing and Sales in B2B.

Below you will find excerpts from events regarding this course:

**Price Negotiation and Sales Presentations**

2572198, WS 18/19, 1 SWS, Open in study portal

**Learning Content**

At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

**Annotation**

- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the following courses can be chosen in the Sales Management Module: Country Manager Simulation, Case Studies in Sales and Pricing or Preisverhandlungen und Verkaufspräsentationen.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

**Workload**

The total workload for this course is approximately 45.0 hours. For further information see German version.
Literature
None
7 COURSES

Course: Pricing [T-WIWI-102883]

7.305 Course: Pricing [T-WIWI-102883]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management
M-WIWI-101489 - Strategie, Kommunikation und Datenanalyse
M-WIWI-101490 - Marketing Management
M-WIWI-101510 - Cross-Functional Management Accounting

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Competence Certificate

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites

None

Recommendation

None

Below you will find excerpts from events regarding this course:

Pricing

2572157, WS 18/19, 2 SWS, Open in study portal

Learning Content

This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

Annotation

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

Workload

The total workload for this course is approximately 135.0 hours. For further information see German version.
7.306 Course: Principles of Ceramic and Powder Metallurgy Processing [T-MACH-102111]

**Responsible:** Dr. Günter Schell

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Competence Certificate**
The assessment consists of an oral exam (20-30 min) taking place at the agreed date. The re-examination is offered upon agreement.

**Prerequisites**
none

**Below you will find excerpts from events regarding this course:**

**Learning Content**
The course covers fundamentals of the process technology for shaping of ceramic or metal particle systems. Important shaping methods are reviewed. The focus is on characterization and properties of particulate systems, and, in particular, on process technology for shaping of powders, pastes, and suspensions.

**Workload**
regular attendance: 25 hours
self-study: 95 hours

**Literature**
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
## 7.307 Course: Principles of Food Process Engineering [T-CIWVT-101874]

**Responsible:** Dr. Volker Gaukel  
**Organisation:** KIT Department of Chemical and Process Engineering  
**Part of:** M-CIWVT-101120 - Grundlagen Lebensmittelverfahrenstechnik

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### Events

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### Prerequisites

none
7.308 Course: Principles of Insurance Management [T-WIWI-102603]

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<th>Responsible:</th>
<th>Prof. Dr. Ute Werner</th>
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**Type**
Prüfungsleistung mündlich

**Credits**
4,5

**Recurrence**
Each summer term

**Version**
1

**Competence Certificate**
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).
The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).
The examination will be offered latest until summer term 2017 (beginners only).

**Prerequisites**
None

**Recommendation**
None
7.309 Course: Process Engineering [T-BGU-101844]

**Responsible:** Dr.-Ing. Harald Schneider

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101110 - Verfahrenstechnik im Baubetrieb

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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7 Course: Process Mining [T-WIWI-109799]

**Responsible:** Prof. Dr. Andreas Oberweis  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik

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<td>Practice (Ü)</td>
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### Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

### Prerequisites

None

### Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-WIWI-102662 - Workflow-Management must not have been started.

### Annotation

Former name (up to winter semester 2018/1019) "Workflow Management".

Below you will find excerpts from events regarding this course:

**Process Mining**

2511204, SS 2019, 2 SWS, Open in study portal

### Learning Content

A workflow is that part of a business process which is automatically executed by a computerized system. Workflow management includes the design, modelling, analysis, execution and management of workflows. Workflow management systems are standard software systems for the efficient control of processes in enterprises and organizations. Knowledge in the field of workflow management systems is especially important during the design of systems for process support.

The course covers the most important concepts of workflow management. Modelling and design techniques are presented and an overview about current workflow management systems is given. Standards, which have been proposed by the workflow management coalition (WfMC), are discussed. Petri nets are proposed as a formal modelling and analysis tool for business processes. Architecture and functionality of workflow management systems are discussed. The course is a combination of theoretical foundations of workflow management concepts and of practical application knowledge.

### Workload

- Lecture 30h
- Exercise 15h

Preparation of lecture 30h  
Preparation of exercises 30h  
Exam preparation 44h  
Exam 1h

Total: 150h
Literature


Further literature is given in the lecture.
Course: Product and Innovation Management [T-WIWI-109864]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101514 - Innovationsökonomik

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<td>2 SWS</td>
<td>Lecture (V) Klarmann</td>
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</table>

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102812 - Product and Innovation Management must not have been started.

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

Below you will find excerpts from events regarding this course:

Product and Innovation Management
2571154, SS 2019, 2 SWS, Open in study portal

Learning Content
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

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

Workload
Total effort for 3 credit points: approx. 90 hours
Presence time: 30 hours
Preparation and wrap-up of LV: 45.0 hours
Exam and exam preparation: 15.0 hours

Literature
7.312 Course: Production and Logistics Controlling [T-WIWI-103091]

**Responsible:** Alexander Rausch  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-MACH-101263 - Einführung in die Logistik  
- M-MACH-101277 - Materialfluss in Logistiksystemen  
- M-MACH-101278 - Materialfluss in vernetzten Logistiksystemen  
- M-MACH-101279 - Technische Logistik  
- M-MACH-101280 - Logistik in Wertschöpfungsnetzwerken  
- M-MACH-101282 - Globale Produktion und Logistik  

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**Competence Certificate**  
The assessment consists of a written exam (60 minutes) following §4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**  
None

Below you will find excerpts from events regarding this course:

**Produktions- und Logistikcontrolling**  
2500005, WS 18/19, 2 SWS, Open in study portal

**Learning Content**  
1. Overview of Controlling  
2. Performance Measurement  
3. Planning  
4. Reporting  
5. Deviation Analysis
7.313 Course: Production and Logistics Management [T-WIWI-102632]

 Responsible: Prof. Dr. Frank Schultmann
 Organisation: KIT Department of Economics and Management
 Part of: M-WIWI-101412 - Industrielle Produktion III

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Competence Certificate
The assessment consists of a written exam (90 minutes) (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events regarding this course:

Production and Logistics Management
2581954, SS 2019, 2 SWS, Open in study portal

Description
This course covers central tasks and challenges of an operative production and logistics management. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Methods to solve these tasks will be explored with respect to manufacturing program planning, material and time. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in PPS. Finally, commercially available PPS-, ERP- and Advanced Planning Systems will be presented and discussed.

Learning Content
This course covers central tasks and challenges of operational production and logistics management. Systems analytically, central planning tasks are discussed. Exemplary solution approaches for these tasks are presented. Further practical approaches are explained. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in Supply Chain Management.

Workload
Total effort required will account for approximately 165h (5.5 credits).

Literature
will be announced in the course
7.314 Course: Project Management [T-WIWI-103134]

**Responsible:** Prof. Dr. Frank Schultmann

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101412 - Industrielle Produktion III  
M-WIWI-101471 - Industrielle Produktion II

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**Competence Certificate**

The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

None

Below you will find excerpts from events regarding this course:

**Project Management**

2581963, WS 18/19, 2 SWS, Open in study portal

**Learning Content**

1. Introduction  
2. Principles of Project Management  
3. Project Scope Management  
4. Time Management and Resource Scheduling  
5. Cost Management  
6. Quality Management  
7. Risk Management  
8. Stakeholder  
9. Communication, Negotiation and Leadership  
10. Project Controlling

**Workload**

The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**

will be announced in the course
### 7.315 Course: Project Management in Construction and Real Estate Industry I

**[T-BGU-103432]**

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<th>Responsible</th>
<th>Prof. Dr.-Ing. Shervin Haghsheno</th>
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| Part of | M-BGU-101884 - Lean Management im Bauwesen  
M-BGU-101888 - Projektmanagement im Bauwesen |

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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
### 7.316 Course: Project Management in Construction and Real Estate Industry II [T-BGU-103433]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101884 - Lean Management im Bauwesen  
- M-BGU-101888 - Projektmanagement im Bauwesen  

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### Prerequisites

None

### Recommendation

None

### Annotation

None
7.317 Course: Project Paper Lean Construction [T-BGU-101007]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101884 - Lean Management im Bauwesen

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**Competence Certificate**

project:
report, appr. 10 pages, and
presentation, appr. 10 min.

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
### 7.318 Course: Project Studies [T-BGU-101847]

**Responsible:** Prof. Dr.-Ing. Sascha Gentes  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101110 - Verfahrenstechnik im Baubetrieb

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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.319 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 - Fahrzeugeigenschaften  
M-MACH-101265 - Fahrzeugentwicklung  
M-MACH-101266 - Fahrzeugtechnik

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Events

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<td>Project Workshop: Automotive Engineering</td>
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<td>Gauterin, Gießler, Frey</td>
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</tbody>
</table>

Competence Certificate
Oral examination
Duration: 30 up to 40 minutes
Auxiliary means: none

Prerequisites
none

Below you will find excerpts from events regarding this course:

Project Workshop: Automotive Engineering
2115817, WS 18/19, 3 SWS, [Open in study portal]

Notes
Limited number of participants with selection procedure, in German language. Please send the application at the end of the previous semester.  
Date and room: see homepage of institute.

Learning 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.

Annotation
Selection procedure, applications are to submit in the end of the preceding semester.

Workload
regular attendance: 49 hours  
self-study: 131 hours
The scripts will be supplied in the start-up meeting.

Learning 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.

Annotation
Selection procedure, applications are to submit in the end of the preceding semester.

Workload
regular attendance: 49 hours
self-study: 131 hours

Literature

The scripts will be supplied in the start-up meeting.
7.320 Course: Public Management [T-WIWI-102740]

**Responsible:** Prof. Dr. Berthold Wigger

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101504 - Collective Decision Making
- M-WIWI-101511 - Vertiefung Finanzwissenschaft

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**Events**

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**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 regarding this course:

**Learning Content**

The lecture “Public Management” deals with the economic theory of public sector administration. It is divided into four parts. The first section gives an overview of the legal framework of governmental administration in the Federal Republic of Germany and introduces the classical theory of administration as developed by Weber. Part two studies concepts of public decision-making, which have a significant impact on the operation of public sector administrations and where one focus is on consistency problems of collective decision-making. The third chapter deals with efficiency problems arising in conventionally organized public administrations and companies. X-inefficiency, information and control problems, the isolated consideration of income-spending-relations as well as rent-seeking problems will be considered. In section four the concept of New Public Management, which is a new approach to public sector administration that is mainly based in contract theory, is introduced. Its foundations in institutional economics are developed, with a focus on the specific incentive structures in self-administered administrations. Finally, the achievements of New Public Management approaches are discussed.

**Workload**

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

**Literature**

Elective literature:

### T.321 Course: Public Media Law [T-INFO-101311]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101217 - Öffentliches Wirtschaftsrecht

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7.322 Course: Public Revenues [T-WIWI-102739]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Vertiefung Finanzwissenschaft

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Events

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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 regarding this course:

Public Revenues
2560120, SS 2019, 2 SWS, Open in study portal

Lecture (V)

Description
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 dept-incursing.

Learning 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 dept-incursing.

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

Literature

Elective literature:
7.323 Course: Quality Management [T-MACH-102107]

**Responsible:** Prof. Dr.-Ing. Gisela Lanza

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101282 - Globale Produktion und Logistik
- M-MACH-101284 - Vertiefung der Produktionstechnik

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**Competence Certificate**

Written Exam (60 min)

**Prerequisites**

none

**Below you will find excerpts from events regarding this course:**

**Quality Management**

2149667, WS 18/19, 2 SWS, Open in study portal

**Description**

**Media:**
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)

**Learning 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 elds 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

**Annotation**

None

**Workload**

regular attendance: 21 hours
self-study: 99 hours
### 7.324 Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

**Responsible:** Dr. Dogan Keles  
Patrick Plötz

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101451 - Energiewirtschaft und Energiemärkte

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**Competence Certificate**

The assessment consists of a written exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

None

Below you will find excerpts from events regarding this course:

### Quantitative Methods in Energy Economics

**2581007, WS 18/19, 2 SWS, Open in study portal**

**Learning Content**

Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

**Workload**

The total workload for this course is approximately 120 hours. For further information see German version.
7.325 Course: Quantum Functional Devices and Semiconductor Technology [T-ETIT-100740]

**Responsible:** Prof. Dr.-Ing. Christian Koos

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:**
- M-MACH-101294 - Nanotechnologie
- M-MACH-101295 - Optoelektronik und Optische Kommunikationstechnik

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**Events**

| SS 2019 | 2309476 | Quantum Functional Devices and Semiconductor Technology | 2 SWS | Lecture (V) | Walther |

**Prerequisites**

none
Course: Real Estate Economics and Sustainability Part 1: Basics and Valuation [T-WIWI-102838]

Responsible: Prof. Dr. David Lorenz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101508 - Immobilienwirtschaft und Nachhaltigkeit

Competence Certificate
The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (Part 1: Basics and Valuation and Part 2: Reporting and Rating) happen in the same semester in which the lectures take place. Therefore, Part I currently only takes place in the winter semester and Part II takes place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

Prerequisites
None

Recommendation
A combination with courses in the area of

- Finance
- Insurance
- Civil engineering and architecture

is recommended.
Particularly recommended is the successful completion of the following Bachelor-Modules:

- Real Estate Management I and II
- Design, Construction and Assessment of Green Buildings I and II
7.327 Course: Real Estate Economics and Sustainability Part 2: Reporting and Rating [T-WIWI-102839]

**Responsible:** Prof. Dr David Lorenz  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101508 - Immobilienwirtschaft und Nachhaltigkeit

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**Competence Certificate**

It is currently unclear whether the course "Real Estate Economics and Sustainability Part 2: Reporting and Rating" can be offered in summer term 2018. It must therefore be expected that the corresponding module M-WIWI-101508 "Real Estate Management and Sustainability" can not be completed according to schedule.

The examination for the courses generally consist of a 60 minute written exam. A 20 minute oral exam is only offered after the second failure of the written exam. The exams for the respective parts (Part 1: Basics and Valuation and Part 2: Reporting and Rating) happen in the same semester in which the lectures take place.

Therefore, Part I currently only takes place in the winter semester and Part II takes place in the summer semester. In each semester there are two alternative dates for the exam and exams can be re-sat at any regular exam date.

**Prerequisites**

None

**Recommendation**

A combination with courses in the area of

- Finance
- Insurance
- Civil engineering and architecture

is recommended.

Particularly recommended is the successful completion of the following Bachelor-Modules:

- Real Estate Management I and II
- Design, Construction and Assessment of Green Buildings I and II
# Course: Recommender Systems [T-WIWI-102847]

**Responsible:** Prof. Dr. Andreas Geyer-Schulz  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101410 - Business & Service Engineering  
- M-WIWI-101470 - Data Science: Advanced CRM

### Type and Credits

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### Competence Certificate

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

### Prerequisites

None

### Recommendation

None

Below you will find excerpts from events regarding this course:

**Recommender Systems**  
2540506, SS 2019, 2 SWS, [Open in study portal](#)

### Learning Content

At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

### 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
Literature
Elective literature:

T 7.329 Course: Regulation Theory and Practice [T-WIWI-102712]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Netzwerkökonomie
M-WIWI-101451 - Energiewirtschaft und Energiemärkte

Competence Certificate
The lecture is not offered for an indefinite period of time.
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

Prerequisites
None

Recommendation
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor’s degree) are expected.
Particularly helpful but not necessary: Industrial Economics and Principal-Agent- or Contract theories. Prior attendance of the lecture Competition in Networks [26240] is helpful in any case but not considered a formal precondition.

Annotation
The lecture is not offered for an indefinite period of time.
7.330 Course: Risk Communication [T-WIWI-102649]

Responsible: Prof. Dr. Ute Werner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101449 - Insurance Management II

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Competence Certificate
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (30 min.) according to Section 4 (2), 2 of the examination regulation.

The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

Prerequisites
None

Recommendation
None
### Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

**Responsible:** Dr. Marcus Wiens  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101412 - Industrielle Produktion III  
- M-WIWI-101471 - Industrielle Produktion II

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**Competence Certificate**
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

Below you will find excerpts from events regarding this course:

#### Risk Management in Industrial Supply Networks
2581992, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**

- supply chain management: introduction, aims and trends
- industrial risk management
- definition und characterization of risks: sourcing and procurement, demand, production and infrastructure
- identification of risks
- risk controlling
- risk assessment and decision support tools
- risk prevention and mitigation strategies
- robust design of supply chain networks
- supplier selection
- capacity management
- business continuity management

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**
will be announced in the course
7.332 Course: Roadmapping [T-WIWI-102853]

Responsible: Dr. Daniel Jeffrey Koch  
Organisation: KIT Department of Economics and Management  
Part of:  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101507 - Innovationsmanagement  
- M-WIWI-101507 - Innovationsmanagement

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Events

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Competence Certificate

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.

Annotation
See German version.

Below you will find excerpts from events regarding this course:

Roadmapping  
2545102, SS 2019, 2 SWS, Open in study portal

Learning Content
Roadmapping is a method used to support innovation decisions in the early phase of innovation management. The roadmapping process addresses the procedure of constructing roadmaps which can then be assessed. Roadmapping provides structured and graphical visualizations of preferably future-oriented topics which have innovation potentials. The benefits of the roadmapping method lie in the structured bundling of both technology- and market-driven individual topics and the joint setting of priorities and processes to achieve predetermined corporate targets. As a rule, roadmaps represent a consensus reached by the people involved in their compilation. For this reason, roadmaps are suited to the designation and initial prioritization of emerging technologies and corresponding development projects.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.
7.333 Course: Safety Engineering [T-MACH-105171]

**Responsible:** Hans-Peter Kany  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
- M-MACH-101263 - Einführung in die Logistik  
- M-MACH-101279 - Technische Logistik

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**Competence Certificate**

The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**

none

**Below you will find excerpts from events regarding this course:**

**Safety Engineering**

2117061, WS 18/19, 2 SWS, *Open in study portal*

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**Learning Content**

The course provides basic knowledge of safety engineering. In particular the basics of health at the working place, job safety in Germany, national and European safety rules and the basics of safe machine design are covered. The implementation of these aspects will be illustrated by examples of material handling and storage technology. This course focuses on: basics of safety at work, safety regulations, basic safety principles of machine design, protection devices, system security with risk analysis, electronics in safety engineering, safety engineering for storage and material handling technique, electrical dangers and ergonomics. So, mainly, the technical measures of risk reduction in specific technical circumstances are covered.

**Annotation**

none

**Workload**

regular attendance: 21 hours  
self-study: 99 hours

**Literature**

7.334 Course: Safety Management in Highway Engineering [T-BGU-101674]

**Responsible:** Dr.-Ing. Matthias Zimmermann

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101066 - Sicherheit, EDV und Recht im Straßenwesen

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**Events**

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<td>Lecture / Practice (VÜ)</td>
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**Competence Certificate**
oral exam with 15 minutes

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7.335 Course: Sales Management and Retailing [T-WIWI-102890]

**Responsible:** Prof. Dr. Martin Klarmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101487 - Sales Management

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<th>2 SWS</th>
<th>Lecture (V)</th>
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</table>

**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The lecture is compulsory for the module Sales Management. It is taught in English.  
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

Below you will find excerpts from events regarding this course:

**Learning Content**
The aim of the course "Sales Management and Retailing" is on the one hand to give insights into the challenging realization of a successful sales management and on the other hand to discuss peculiarities of retailing contexts. The contents are below others:

- Customer relationship management (word-of-mouth-analysis, key account management, loyalty programs, complain management etc.)
- Retail marketing (trends, point of sale design etc.)
- Retailer-producer relationships

**Annotation**
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).  
This course is held in English.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
7.336 Course: Selected Applications of Technical Logistics [T-MACH-102160]

Responsible: Viktor Milushev  
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technische Logistik

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<td>Lecture (V)</td>
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</table>

Competence Certificate

The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites

none

Recommendation

Knowledge out of Basics of Technical Logistics (T-MACH-102163) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned

Below you will find excerpts from events regarding this course:

Selected Applications of Technical Logistics

2118087, SS 2019, 3 SWS, Open in study portal

Description

Media:  
supplementary sheets, projector, blackboard

Notes

Details according schedule will be published

Learning Content

- design and dimension of machines from intralogistics
- static and dynamic behaviour
- operation properties and specifics
- Inside practical lectures: sample applications and calculations in addition to the lectures

Annotation

Knowledge out of Basics of Technical Logistics preconditioned

Workload

presence: 36h  
rework: 84h

Literature

Recommendations during lessons
7.337 Course: Selected Applications of Technical Logistics - Project [T-MACH-108945]

**Responsible:** Viktor Milushev  
Dr.-Ing. Martin Mittwollen

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101279 - Technische Logistik

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**Competence Certificate**
Presentation of performed project and defense (30min) according to §4 (2), No. 3 of the examination regulation

**Prerequisites**
T-MACH-102160 (selected applications of technical logistics) must have been started

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-MACH-102160 - Selected Applications of Technical Logistics must have been started.

**Recommendation**
Knowledge out of Basics of Technical Logistics (T-MACH-102163) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned
7.338 Course: Selected Issues in Critical Information Infrastructures [T-WIWI-109251]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik  

**Type**  
Prüfungsleistung anderer Art  

**Credits**  
4  

**Recurrence**  
Each summer term  

**Version**  
1  

**Competence Certificate**  
non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015). Details will be announced in the respective course.  

**Prerequisites**  
None.
**7.339 Course: Selected legal issues of Internet law [T-INFO-108462]**

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101215 - Recht des Geistigen Eigentums

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<td>24821</td>
<td>Colloquium (KOL)</td>
<td>Dreier</td>
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</table>

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-INFO-101307 - Internet Law must not have been started.
7.340 Course: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

**Responsible:** Dr.-Ing. Timo Mappes

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101287 - Mikrosystemtechnik
- M-MACH-101290 - BioMEMS
- M-MACH-101292 - Mikrooptik

**Competence Certificate**

Oral examination

**Prerequisites**

none
**7.341 Course: Semantic Web Technologies [T-WIWI-102874]**

**Responsible:** Prof. Dr. York Sure-Vetter  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatik  
- M-WIWI-101628 - Vertiefung Informatik  
- M-WIWI-101630 - Wahlpflicht Informatik

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**Events**

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<th>Type</th>
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<th>Time of preparation and postprocessing</th>
<th>Exam and exam preparation</th>
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<td>SS 2019</td>
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<td>Semantic Web Technologies</td>
<td>Lecture (V)</td>
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<td>SS 2019</td>
<td>1 SWS</td>
<td>Exercises to Semantic Web Technologies</td>
<td>Practice (Ü)</td>
<td>45 hours</td>
<td>67.5 hours</td>
<td>37.5 hours</td>
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</table>

**Competence Certificate**
The assessment consists of an 1h written exam following §4, Abs. 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation. The exam takes place every semester and can be repeated at every regular examination date.

**Prerequisites**
None

**Recommendation**
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required.

Below you will find excerpts from events regarding this course:

**Semantic Web Technologies**

2511310, SS 2019, 2 SWS, [Open in study portal](#)

**Description**
The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals. Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

**Learning Content**
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

**Workload**

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours
Literature


Additional Literature


Exercises to Semantic Web Technologies

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

Learning Content
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Workload
The total workload for the lecture Semantic Web Technologies is given out on the description of the lecture.

Literature


Additional Literature

7.342 Course: Seminar Data-Mining in Production [T-MACH-108737]

**Responsible:** Prof. Dr.-Ing. Gisela Lanza  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-WIWI-101808 - Seminarmodul

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<td>Seminar Data Mining in Production</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
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<td>SS 2019</td>
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<td>Seminar Data Mining in Production</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Lanza</td>
</tr>
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</table>

**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](https://www.wbk.kit.edu/studium-und-lehre.php).

Below you will find excerpts from events regarding this course:

**Seminar Data Mining in Production**

2151643, WS 18/19, 2 SWS, Open in study portal  

**Description**

Media:

KNIME Analytics Platform

**Notes**

The dates and deadlines for the seminar will be announced at [https://www.wbk.kit.edu/studium-und-lehre.php](https://www.wbk.kit.edu/studium-und-lehre.php). The number of students is limited to twelve.

**Learning 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.

**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](https://www.wbk.kit.edu/studium-und-lehre.php).
Workload
regular attendance: 10 hours
self-study: 80 hours

Seminar Data Mining in Production
2151643, SS 2019, 2 SWS, Open in study portal

Description
Media:
KNIME Analytics Platform

Learning 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.

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.

Workload
regular attendance: 10 hours
self-study: 80 hours
# 7.343 Course: Seminar in Business Administration A (Master) [T-WIWI-103474]

**Responsible:**
- Prof. Dr. Wolf Fichtner
- Prof. Dr. Hansjörg Fromm
- Prof. Dr. Andreas Geyer-Schulz
- Prof. Dr. Ju-Young Kim
- Prof. Dr. Martin Klarmann
- Prof. Dr. Peter Knauth
- Prof. Dr. Hagen Lindstädt
- Prof. Dr David Lorenz
- Dr. Torsten Luedecke
- Prof. Dr.-Ing. Thomas Lützkendorf
- Prof. Dr. Alexander Mädche
- Prof. Dr. Bruno Neibecker
- Prof. Dr. Stefan Nickel
- Prof. Dr. Petra Nieken
- Prof. Dr. Martin Ruckes
- Prof. Dr. Gerhard Satzger
- Prof. Dr. Frank Schultmann
- Prof.Dr. Thomas Setzer
- Prof. Dr. Orestis Terzidis
- Prof. Dr. Marliese Uhrig-Homburg
- Prof. Dr Maxim Ulrich
- Prof. Dr. Christof Weinhardt
- Prof. Dr. Marion Weissenberger-Eibl
- Prof. Dr. Ute Werner
- Prof. Dr. Marcus Wouters

**Organisation:**
KIT Department of Economics and Management

**Part of:**
M-WIWI-101808 - Seminarmodul

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**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§4(2), 3 SPO 2015) consists of:

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**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 regarding this course:

**Automated Financial Advisory**

2500002, WS 18/19, 2 SWS, Open in study portal

**Learning Content**

At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Industrial Engineering and Management M.Sc.
Module Handbook as of 04.03.2019
Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

Master Seminar in Information Engineering and Management
2540510, WS 18/19, 2 SWS, Open in study portal

Learning Content
The seminar servers on one hand to improve the scientific working skills. On the other hand, the student should work intensively on a given topic and develop a scientific work, that is based on a profound literature research.

The seminar can also be a implementation of software for a scientific problem (e.g. Business Games/dynamic systems) according to the individual focus in the current semester. The software has to be well documented. The written elaboration covers a description and explanation of the software as well as a discussion about limits and extensibility. Furthermore the software must be deployable and shall be presented on the infrastructure stack of the chair. An implementation of a software has to examine the scientific state of the art in a critical way, too.

A concrete description of the current topics is announced in time for the begin of the application stage.

Workload
The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

Digital Service Design Seminar
2540559, WS 18/19, 3 SWS, Open in study portal

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: "The destiny of computers – like other mass technologies like electricity, paper, and running water - is to become invisible, that is, to disappear into the fabric of our lives; to be everywhere and nowhere, silently and seamlessly carrying out our wishes." Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content
- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

Seminar in Marketing und Vertrieb (Master)
2572181, WS 18/19, SWS, Open in study portal

Learning Content
The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Annotation
Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)
**Workload**  
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**  
will be announced in the seminar.

<table>
<thead>
<tr>
<th>Seminar Human Resources and Organizations</th>
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<tr>
<td>2573010, WS 18/19, 2 SWS, Open in study portal</td>
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**Learning Content**  
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

**Workload**  
The total workload for this course is approximately 90 hours.  
Lecture 30h  
Preparation of lecture 45h  
Exam preparation 15h

<table>
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<tr>
<th>Seminar Human Resource Management</th>
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**Workload**  
The total workload for this course is approximately 90 hours.  
Lecture 30h  
Preparation of lecture 45h  
Exam preparation 15h

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**Learning Content**  
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

**Workload**  
The total workload for this course is approximately 90 hours.  
Lecture 30h  
Preparation of lecture 45h  
Exam preparation 15h

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**Learning Content**  
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

**Workload**  
The total workload for this course is approximately 90 hours.  
Lecture 30h  
Preparation of lecture 45h  
Exam preparation 15h

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<tr>
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**Literature**  
Selected journal articles and books.
Automated Financial Advisory  
2530372, SS 2019, 2 SWS, Open in study portal

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

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

Literature
Literature will be distributed during the first lecture.

Seminar in Finance (Master, Prof. Uhrig-Homburg)  
2530580, SS 2019, 2 SWS, Open in study portal

Learning Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

Masterseminar Big Data Mining in Finance  
2540510, SS 2019, 2 SWS, Open in study portal

Literature
Literature:

Hospital Management  
2550493, SS 2019, 2 SWS, Open in study portal

Description
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals and relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Learning Content
The seminar ‘Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals and relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Annotation
It is planned to offer the course every semester.
Workload
The total workload for this course is approximately 90 hours.

Seminar Management Accounting
2579904, SS 2019, 2 SWS, Open in study portal

Learning 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.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

Special Topics in Management Accounting
2579905, SS 2019, 2 SWS, Open in study portal

Learning 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 predisceded. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.
### 7.344 Course: Seminar in Business Administration B (Master) [T-WIWI-103476]

**Responsible:**
- Prof. Dr. Wolf Fichtner
- Prof. Dr. Hansjörg Fromm
- Prof. Dr. Andreas Geyer-Schulz
- Prof. Dr. Ju-Young Kim
- Prof. Dr. Martin Klarmann
- Prof. Dr. Peter Knauth
- Prof. Dr. Hagen Lindstädt
- Prof. Dr. David Lorenz
- Dr. Torsten Luedcke
- Prof. Dr.-Ing. Thomas Lützkendorf
- Prof. Dr. Alexander Mädche
- Prof. Dr. Bruno Neibecker
- Prof. Dr. Stefan Nickel
- Prof. Dr. Petra Nieken
- Prof. Dr. Martin Ruckes
- Prof. Dr. Gerhard Satzger
- Prof. Dr. Frank Schultmann
- Prof. Dr. Thomas Setzer
- Prof. Dr. Orestis Terzidis
- Prof. Dr. Marliese Uhrig-Homburg
- Prof. Dr. Maxim Ulrich
- Prof. Dr. Christof Weinhardt
- Prof. Dr. Marion Weissenberger-Eibl
- Prof. Dr. Ute Werner
- Prof. Dr. Marcus Wouters

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101808 - Seminarmodul

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<td>Seminar: Energy Informatics</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
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<td>2500002</td>
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<td>2530293</td>
<td>Seminar in Finance (Master)</td>
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<td>2540510</td>
<td>Master Seminar in Information Engineering and Management</td>
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<td>2573011</td>
<td>Seminar Human Resource Management</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Nieken, Mitarbeiter</td>
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### Competence Certificate

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

### 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 regarding this course:**

#### Automated Financial Advisory

2500002, WS 18/19, 2 SWS, Open in study portal

#### Learning Content

At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.
Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

Master Seminar in Information Engineering and Management
2540510, WS 18/19, 2 SWS, Open in study portal

Learning Content
The seminar servers on one hand to improve the scientific working skills. On the other hand, the student should work intensively on a given topic and develop a scientific work, that is based on a profound literature research.

The seminar can also be a implementation of software for a scientific problem (e.g. Business Games/dynamic systems) according to the individual focus in the current semester. The software has to be well documented. The written elaboration covers a description and explanation of the software as well as a discussion about limits and extensibility. Furthermore the software must be deployable and shall be presented on the infrastructure stack of the chair. An implementation of a software has to examine the scientific state of the art in a critical way, too.

A concrete description of the current topics is announced in time for the begin of the application stage.

Workload
The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

Digital Service Design Seminar
2540559, WS 18/19, 3 SWS, Open in study portal

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: "The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives; to be everywhere and nowhere, silently and seamlessly carrying out our wishes." Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content
- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

Seminar in Marketing und Vertrieb (Master)
2572181, WS 18/19, SWS, Open in study portal

Learning Content
The seminar teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Annotation
Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)
Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
will be announced in the seminary.

Seminar Human Resources and Organizations
2573010, WS 18/19, 2 SWS, Open in study portal

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.
Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

Seminar Human Resource Management
2573011, WS 18/19, 2 SWS, Open in study portal

Workload
The total workload for this course is approximately 90 hours.
Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

Seminar Human Resource Management (Master)
2500006, SS 2019, 2 SWS, Open in study portal

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

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.

Seminar Human Resources and Organizations (Master)
2500007, SS 2019, 2 SWS, Open in study portal

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.
Lecture 30h
Preparation of lecture 45h
Exam preparation 15h
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<th>Course</th>
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**Automated Financial Advisory**

**Learning Content**
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

**Workload**
The total workload for this course is approximately 90 hours.

**Literature**

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**Seminar in Finance (Master, Prof. Uhrig-Homburg)**

**Learning Content**
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Will be announced at the end of the foregoing semester.

**Masterseminar Big Data Mining in Finance**

**Literature**

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**Hospital Management**

**Description**
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals and relates this to common and expected conditions of other service industries. Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

**Learning Content**
The seminar ‘Hospital Management’ presents internal organization structures, work conditions and work environments at the example of hospitals and relates this to common and expected conditions of other service industries. Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

**Annotation**
It is planned to offer the course every semester.
Workload
The total workload for this course is approximately 90 hours.

Learning 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.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.
7.345 Course: Seminar in Economic Policy [T-WIWI-102789]

**Responsible:** Prof. Dr. Ingrid Ott  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101514 - Innovationsökonomik

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**Events**

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<td>Cooperation seminar: Innovative applications on single board computers as well as their economic relevance</td>
<td>3 SWS</td>
<td>Seminar / Practical course (S/P)</td>
<td>Sure-Vetter, Ott, Weller, Bälz</td>
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**Competence Certificate**

The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted graded examinations. (Essay 50\%, 40\% oral presentation, active participation 10\%).

**Prerequisites**

None

**Recommendation**

At least one of the lectures "Theory of Endogenous Growth" or "Innovation Theory and Policy" should be attended in advance, if possible.

Below you will find excerpts from events regarding this course:

**Cooperation seminar: Innovative applications on single board computers as well as their economic relevance**  
2512312, WS 18/19, 3 SWS, [Open in study portal](#)
7 COURSES

Course: Seminar in Economic Policy [T-WIWI-102789]

Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic function opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

• Smart Home Applications
• Environmental measurements
• Gesture control
• Security systems
# 7.346 Course: Seminar in Economics A (Master) [T-WIWI-103478]

**Responsible:** Prof. Dr. Johannes Brumm  
Prof. Dr. Jan Kowalski  
Prof. Dr. Kay Mitusch  
Prof. Dr. Ingrid Ott  
Prof. Dr. Clemens Puppe  
Prof. Dr. Johannes Philipp Reiß  
Prof. Dr. Nora Szech  
Prof. Dr. Berthold Wigger

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101808 - Seminarmodul

### Events

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### Competence Certificate

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

### 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 regarding this course:

### Cooperation seminar: Innovative applications on single board computers as well as their economic relevance

**Seminar / Practical course (S/P)**

2512312, WS 18/19, 3 SWS, [Open in study portal](Open in study portal)

**Description**

This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic function opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

**Notes**

The exact dates and information for registration will be announced at the event page.

**Learning Content**

Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

### Topics on Political Economics

**Seminar (S)**

2560140, WS 18/19, 2 SWS, [Open in study portal](Open in study portal)

**Workload**

About 90 hours.

### Advanced Topics in Econometrics

**Seminar (S)**

2521310, SS 2019, 2 SWS, [Open in study portal](Open in study portal)

**Annotation**

The course will be offered in English.

### Topics in Political Economics (Master)

**Seminar (S)**

2560552, SS 2019, 2 SWS, [Open in study portal](Open in study portal)
Description
In many companies relative reward schemes are used whereby employees earn a bonus if they perform better than their colleagues. Moreover, hierarchical structures mean that in many organizations, employees find themselves in constant competition for promotions. This is meant to provide incentives for higher performance. However, competitive remuneration schemes could also have detrimental effects such that individual workers may view their colleagues as direct competitors generating more selfish and/or less helpful behavior in the workplace. Furthermore, age, gender and culture seem to have impacts on willingness to compete. For example, in western cultures, adult men sometimes enter competition even though their performance level is way too low for success, i.e., they harm themselves by over-competitiveness. In contrast, adult females sometimes compete less than they could do successfully.

Another challenge in contest design, e.g. in sports, is that when competition takes place among workers with mixed abilities it may lead to a discouragement effect, which establishes that lower ability individuals often reduce effort competing against an individual they do not feel up to (e.g. it has been found that average golf players performed significantly worse when competing against a superstar like Tiger Woods). One solution suggested by the economic literature is to level the playing field between advantaged and disadvantaged individuals by favoring weaker individuals through bid-caps, asymmetric tie-breaking rules, or advances. In sports, asymmetric tie-breaking is already common, for instance, in the Champions League soccer playoffs “away goals” become the decisive factor in determining the winning team in case of a tie.

Contests are not only a well-established mechanism for incentivizing workers but also for encouraging innovation and advancing R&D. Elements of research and innovation contests can be found in the procurement of various goods and services. For instance, the construction of new buildings, proposals in a venture capital firm or TV shows for entertainment companies all flow through a similar innovation process that involves the solicitation of bids from multiple potential suppliers and the preparation of a pilot or a proposal. In other cases, e.g., in lobbying contests, it is often discussed whether investments are beneficial or not. Some authors have argued that investments into lobbying should be capped in order to soften competition among asymmetrically strong interest groups (e.g. the lobbying industry versus consumers’ interest groups). Of course, then the question arises whether such caps achieve the respective design goal or not.

In this seminar, we discuss questions like: How can we design workplaces and labor contracts to increase motivation and productivity? How can contests be used to foster innovation? Which role should social preferences play and how could they inspire specific contest designs? How should sport contests be engineered depending on the respective goals? How should we design lobbying contests?

Also related topics are very welcome!

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact Patrick Maus (Patrick.Maus@kit.edu).

Workload
About 90 hours

Literature


Morals and Social Behavior (Master)
2560554, SS 2019, 2 SWS, Open in study portal

Description
For a long time, economists studied given markets and mechanisms to predict outcomes, future developments or generally the participants’ behavior. In contrast, Market Design uses theory, empirical and experimental work to design markets which incentivize their participants in a way that leads to a “desirable” outcome. In this, the designer can have different objectives, for example: Maximizing efficiency, welfare or minimizing negative externalities.

Prominent applications of Market Design include, quite topical, Germany’s auction of 5G mobile licenses and matching markets, where there are two large populations that need to be matched to one another (think of hospitals and interns, students and dorm rooms or kidney donors and receivers). In this seminar, we think about ways to either design new markets or how we could alter existing ones in a socially beneficial way. Alternatively, research ideas could focus on finding failures or shortcomings of ineffectively designed markets.
Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.
### 7.347 Course: Seminar in Economics B (Master) [T-WIWI-103477]

**Responsible:**
- Prof. Dr. Johannes Brumm
- Prof. Dr. Jan Kowalski
- Prof. Dr. Kay Mitsuč
- Prof. Dr. Ingrid Ott
- Prof. Dr. Clemens Puppe
- Prof. Dr. Johannes Philipp Reiß
- Prof. Dr. Nora Szech
- Prof. Dr. Berthold Wigger

**Organisation:**
KIT Department of Economics and Management

**Part of:**
M-WIWI-101808 - Seminarmodul

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- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**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.

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**Notes**
The exact dates and information for registration will be announced at the event page.

**Learning Content**
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

**Workload**
About 90 hours.

**Advanced Topics in Econometrics**

**Annotation**
The course will be offered in English.

**Topics in Political Economics**

**Topics in Political Economics (Master)**
Description
In many companies relative reward schemes are used whereby employees earn a bonus if they perform better than their colleagues. Moreover, hierarchical structures mean that in many organizations, employees find themselves in constant competition for promotions. This is meant to provide incentives for higher performance. However, competitive remuneration schemes could also have detrimental effects such that individual workers may view their colleagues as direct competitors generating more selfish and/or less helpful behavior in the workplace. Furthermore, age, gender and culture seem to have impacts on willingness to compete. For example, in western cultures, adult men sometimes enter competition even though their performance level is way too low for success, i.e., they harm themselves by over-competitiveness. In contrast, adult females sometimes compete less than they could do successfully.

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Also related topics are very welcome!

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact Patrick Maus (Patrick.Maus@kit.edu).

Workload
About 90 hours

Literature


Morals and Social Behavior (Master)
2560554, SS 2019, 2 SWS, Open in study portal

Description
For a long time, economists studied given markets and mechanisms to predict outcomes, future developments or generally the participants’ behavior. In contrast, Market Design uses theory, empirical and experimental work to design markets which incentivize their participants in a way that leads to a “desirable” outcome. In this, the designer can have different objectives, for example: Maximizing efficiency, welfare or minimizing negative externalities.

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Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.
Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

Responsible: Fachvertreter ingenieurwissenschaftlicher Fakultäten
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminarmodul

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Competence Certificate
See German version.

Prerequisites
See module description.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-103147 - Seminar in Engineering Science (Master) must not have been started.

Recommendation
None
Course: Seminar in Informatics A (Master) [T-WIWI-103479]

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

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101808 - Seminarmodul

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The grade is achieved by the weighted sum of the grades.

**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 regarding this course:

### Linked Data and the Semantic Web

**2512301, WS 18/19, 3 SWS, [Open in study portal]**

#### Description

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'.

#### Notes

The exact dates and information for registration will be announced at the event page.

#### Workload

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

### Real-World Challenges in Data Science and Analytics

**2512311, WS 18/19, 3 SWS, [Open in study portal]**

#### Notes

The exact dates and information for registration will be announced at the event page.

### Cooperation seminar: Innovative applications on single board computers as well as their economic relevance

**2512312, WS 18/19, 3 SWS, [Open in study portal]**
Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).
The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic func- tion opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry PIs, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

Emerging Trends in Critical Information Infrastructures
2513400, WS 18/19, 2 SWS, Open in study portal

Description
The block seminar Emerging Trends in Critical Information Infrastructures aims to provide insights into emerging topics in the field of information systems and to offer students an opportunity to write their first academic paper alone or in a group of students. Each semester, different topics are offered around the lectures and research domains of Prof. Sunyaev's chair, especially Trusted Engineering, Digital Health, Internet Technologies as well as Auditing and Certifications. Students can also submit their own topic suggestions within the framework of the main topics specified in the respective semester.

Seminar Service Science, Management & Engineering
2595470, WS 18/19, 2 SWS, Open in study portal

Learning 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

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.
Knowledge Discovery and Data Mining
2512300, SS 2019, 3 SWS, Open in study portal

Description
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.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning

Data Science & Real-time Big Data Analytics
2513306, SS 2019, 2 SWS, Open in study portal

Description
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.

Seminar Service Science, Management & Engineering
2595470, SS 2019, 2 SWS, Open in study portal

Learning 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

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.
Course: Seminar in Informatics B (Master) [T-WIWI-103480]

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminarmodul

### Events

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<td>Linked Data and the Semantic Web</td>
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<td>Real-World Challenges in Data Science and Analytics</td>
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### Competence Certificate

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a talk about the research topic of the seminar together with discussion,  
- a written summary about the major issues of the topic and  
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

### Prerequisites

None.
Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events regarding this course:

Linked Data and the Semantic Web
2512301, WS 18/19, 3 SWS, Open in study portal

Description
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’.

Notes
The exact dates and information for registration will be announced at the event page.

Workload
Topics of interest include, but are not limited to:
- Travel Security
- Geo data
- Linked News
- Social Media

Real-World Challenges in Data Science and Analytics
2512311, WS 18/19, 3 SWS, Open in study portal

Notes
The exact dates and information for registration will be announced at the event page.

Cooperation seminar: Innovative applications on single board computers as well as their economic relevance
2512312, WS 18/19, 3 SWS, Open in study portal
Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).
The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic function opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

Emerging Trends in Critical Information Infrastructures
2513400, WS 18/19, 2 SWS, Open in study portal

Description
The block seminar Emerging Trends in Critical Information Infrastructures aims to provide insights into emerging topics in the field of information systems and to offer students an opportunity to write their first academic paper alone or in a group of students. Each semester, different topics are offered around the lectures and research domains of Prof. Sunyaev's chair, especially Trusted Engineering, Digital Health, Internet Technologies as well as Auditing and Certifications. Students can also submit their own topic suggestions within the framework of the main topics specified in the respective semester.

Seminar Service Science, Management & Engineering
2595470, WS 18/19, 2 SWS, Open in study portal

Learning 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

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.
**Knowledge Discovery and Data Mining**

2512300, SS 2019, 3 SWS, Open in study portal

**Description**
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.

**Notes**
The exact dates and information for registration will be announced at the event page.

**Learning Content**
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

**Literature**
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning

**Data Science & Real-time Big Data Analytics**

2513306, SS 2019, 2 SWS, Open in study portal

**Description**
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.

**Seminar Service Science, Management & Engineering**

2595470, SS 2019, 2 SWS, Open in study portal

**Learning 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

**Workload**
The total workload for this course is approximately 120 hours. For further information see German version.

**Literature**
The student will receive the necessary literature for his research topic.
**Course: Seminar in Operations Research A (Master) [T-WIWI-103481]**

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminarmodul  

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<td>SS 2019 2550132 Seminar zur Mathematischen Optimierung (MA) 2 SWS Seminar (S) Stein, Mohr, Neumann</td>
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<td>SS 2019 2550473 Seminar on Power Systems Optimization (Master) 2 SWS Seminar (S) Rebennack, Assistenten</td>
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<td>SS 2019 2550491 Seminar zur diskreten Optimierung SWS Block (B) Nickel, Mitarbeiter</td>
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**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**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 regarding this course:

**Seminar: Recent Topics in OR**

2550491, WS 18/19, SWS, Open in study portal

**Learning Content**

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

**Annotation**

The seminar is offered in each term.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.
Literature
Literature and relevant sources will be announced at the beginning of the seminar.

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.
7.352 Course: Seminar in Operations Research B (Master) [T-WIWI-103482]

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminarmodul

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**Competence Certificate**  
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of  

- a talk about the research topic of the seminar together with discussion,  
- a written summary about the major issues of the topic and  
- attending the discussions of the seminar  

The grade is achieved by the weighted sum of the grades.

**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 regarding this course:

**Seminar: Recent Topics in OR**  
2550491, WS 18/19, SWS, Open in study portal

**Learning Content**  
The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

**Annotation**  
The seminar is offered in each term.

**Workload**  
The total workload for this course is approximately 90 hours. For further information see German version.
Literature
Literature and relevant sources will be announced at the beginning of the seminar.

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.
### Course: Seminar in Statistics A (Master) [T-WIWI-103483]

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminarmodul

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**Events**

| SS 2019 | 2521310 | Advanced Topics in Econometrics | 2 SWS | Seminar (S) | Schienle, Chen, Görgen |

**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**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](https://portal.wiwi.kit.edu).

**Below you will find excerpts from events regarding this course:**

**Advanced Topics in Econometrics**
2521310, SS 2019, 2 SWS, [Open in study portal](https://campus.kit.edu/)

**Annotation**

The course will be offered in English.
### Course: Seminar in Statistics B (Master) [T-WIWI-103484]

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

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101808 - Seminarmodul

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**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

**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 regarding this course:**

**Advanced Topics in Econometrics**

2521310, SS 2019, 2 SWS, [Open in study portal](#)

**Annotation**

The course will be offered in English.
7.355 Course: Seminar in Transportation [T-BGU-100014]

**Responsible:** Bastian Chlond  
Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**  
M-BGU-101064 - Grundlagen des Verkehrswesens  
M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement  
M-WIWI-101808 - Seminarmodul

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**Competence Certificate**  
seminar paper, appr. 10 pages, and presentation, appr. 10 min.

**Prerequisites**  
none

**Recommendation**  
none

**Annotation**  
none
Course: Seminar Mobility Services (Master) [T-WIWI-103174]

**Responsible:** Prof. Dr. Gerhard Satzger
Carola Stryja

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-BGU-101064 - Grundlagen des Verkehrswesens
- M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Competence Certificate**
A final written exam will be conducted.

**Prerequisites**
None

**Annotation**
The course is not offered regularly.
### Course: Seminar Production Technology [T-MACH-109062]

**Responsible:** Prof. Dr.-Ing. Jürgen Fleischer  
Prof. Dr.-Ing. Gisela Lanza  
Prof. Dr.-Ing. Volker Schulze  

**Organisation:** KIT Department of Mechanical Engineering  

**Part of:** M-WIWI-101808 - Seminarmodul

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**Type:** Prüfungsleistung anderer Art  

**Recurrence:** Each term

**Version:** 1

**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 regarding this course:**

#### Seminar Production Technology

**2149665, SS 2019, 1 SWS, Open in study portal**  

**Description**  
The specific topics are published on the homepage of the wbk Institute of Production Science.

**Learning 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

**Workload**  
regular attendance: 10 hours  
self-study: 80 hours
### T 7.358 Course: Seminar Sensors [T-ETIT-100707]

**Responsible:** Dr. Wolfgang Meneskou  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:**  
- M-ETIT-101158 - Sensorik I  
- M-ETIT-101159 - Sensorik II

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<td></td>
<td>Meneskou</td>
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</table>
### 7.359 Course: Seminar: Governance, Risk & Compliance [T-INFO-102047]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101242 - Governance, Risk & Compliance

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**Events**

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<td>2 SWS</td>
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</table>
### 7.360 Course: Seminar: Legal Studies I [T-INFO-101997]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-WIWI-101808 - Seminarmodul

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<td>Current Issues in Patent Law</td>
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### 7.361 Course: Seminar: Legal Studies II [T-INFO-105945]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-WIWI-101808 - Seminarmodul

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Course: Sensor Systems [T-ETIT-100709]

**Responsible:** Dr. Wolfgang Menesklou

**Organisation:** KIT Department of Electrical Engineering and Information Technology

**Part of:**
- M-ETIT-101158 - Sensorik I
- M-ETIT-101159 - Sensorik II

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# 7.363 Course: Sensors [T-ETIT-101911]

**Responsible:** Dr. Wolfgang Menesklou  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** M-ETIT-101158 - Sensorik I

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### T 7.364 Course: Sensors and Actuators Laboratory [T-ETIT-100706]

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| Part of:     | M-ETIT-101158 - Sensorik I  
               M-ETIT-101159 - Sensorik II |

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7.365 Course: Service Analytics A [T-WIWI-105778]

**Responsible:** Prof. Dr. Hansjörg Fromm  
Prof. Dr. Thomas Setzer

**Organisation:** KIT Department of Economics and Management

**Part of:**  
M-WIWI-101448 - Service Management  
M-WIWI-101470 - Data Science: Advanced CRM  
M-WIWI-101506 - Service Analytics  
M-WIWI-103117 - Data Science: Data-Driven Information Systems

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

**Prerequisites**
None

**Recommendation**
The lecture is addressed to students with interests and basic knowledge in the topics of Operations Research, descriptive and inductive statistics.

Below you will find excerpts from events regarding this course:

**Service Analytics A**  
2595501, SS 2019, 2 SWS, [Open in study portal]

**Learning Content**
Today's service-oriented companies are starting to optimize the way services are planned, operated, and personalized by analyzing vast amounts of data from customers, IT-systems, or sensors. As the statistical learning and business optimization world continues to progress, skills and expertise in advanced data analytics and data and fact-based optimization become vital for companies to be competitive. In this lecture, relevant methods and tools will be considered as a package, with a strong focus on their inter-relations. Students will learn to analyze and structure large amounts of potentially incomplete and unreliable data, to apply multivariate statistics to filter data and to extract key features, to predict future behavior and system dynamics, and finally to formulate data and fact-based service planning and decision models.

More specifically, the lessons of this lecture will include:

- Co-Creation of Value Across Enterprises
- Instrumentation, Measurement, Monitoring of Service Systems
- Descriptive, predictive, and prescriptive Analytics
- Usage Characteristics and Customer Dynamics
- Big Data, Dimensionality Reduction, and Real-Time Analytics
- System Models and What-If-Analysis
- Robust Mechanisms for Service Management
- Industry Applications of Service Analytics

**Tutorials**
Students will conduct lecture accompanying, guided exercises throughout the semester.

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

- Business Analytics for Managers, Jank, W., Springer, 2011

Online Sources:

- The data deluge, The Economist, Feb. 2010

Further readings will be provided in the lecture.
7.366 Course: Service Design Thinking [T-WIWI-102849]

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

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101503 - Service Design Thinking

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**Competence Certificate**

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

**Recommendation**
This course is held in English – proficiency in writing and communication is required.
Our past students recommend to take this course at the beginning of the masters program.

**Annotation**
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June. For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de). Furthermore, the KSRI conducts an information event for applicants every year in May. This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.
Course: Service Innovation [T-WIWI-102641]

**Responsible:** Prof. Dr. Gerhard Satzger

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-101448 - Service Management
- M-WIWI-102806 - Service Innovation, Design & Engineering

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**Competence Certificate**
The assessment consists of an 1h written exam (following §4(2) 1 of the examination regulations) and of assignments during the course as an non exam assessment (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Prerequisites**
None

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Description**
While innovation in manufacturing or agriculture can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice, while many organizations have a well-understood process for innovating in the product business, innovating in services is often still a fuzzy and complex undertaking. In this lecture we will discuss the state of research, compare product and service innovation, understand how innovation diffusion works, examine case studies of service innovation, open vs. closed innovation, how to leverage user communities to drive innovation and understand obstacles, and enable service innovation.

**Learning Content**
While innovation in manufacturing can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice, while many organizations have a well-understood process for innovating in the product business, innovating in services is often still a fuzzy and complex undertaking. In this lecture we will discuss the state of research, compare product and service innovation and understand how innovation diffusion works. We examine case studies on service innovation, compare open vs. closed innovation and learn how to apply different innovation tools, methods and strategies (e.g. service design thinking as a human-centered approach to innovation or technology and strategic foresight, as methods supporting the generation of assumptions on the impact of technology).

**Annotation**
The credits have been changed from 5 to 4,5.

**Workload**
Total workload: approximately 136 hours
Attendance time: 30 hours
Self-study: 105 hours
Literature

- von Hippel, Erich (2007) Horizontal innovation networks - by and for users. Industrial and Corporate Change, 16: 2

Elective literature:

- Fundamentals of Service Systems: http://primo.bibliothek.kit.edu/primo_library/libweb/action/display.dojsessionid=EB30837DDD85CBF7DE6CDE0B1CB39385?tabs=detailsTab&ct=display&fn=search&doc=KITSRC455219141&index=1&recIds=KITSRC455219141&recldxs=0&elementId=0&render=
7.368 Course: Service Oriented Computing [T-WIWI-105801]

**Responsible:** Prof. Dr. York Sure-Vetter

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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<td>Each summer term</td>
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**Competence Certificate**
Please note that the exam will be offered to first-time applicants in the winter semester 2018/2019. A last examination possibility exists in the summer semester 2019 (only for repeaters).

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

**Prerequisites**
None
7.369 Course: Simulation Game in Energy Economics [T-WIWI-108016]

**Responsible:** Dr. Massimo Genoese

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101451 - Energiewirtschaft und Energiemärkte

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**Events**

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<th>Lecture / Practice (VÜ)</th>
<th>Genoese</th>
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</table>

**Competence Certificate**

Examination as written assignment and oral presentation (§4 (2), 1 SPO).

**Prerequisites**

None

**Recommendation**

Visiting the course "Introduction to Energy Economics"

**Annotation**

See German version.

Below you will find excerpts from events regarding this course:

**Simulation Game in Energy Economics**

2581025, SS 2019, 2 SWS, Open in study portal

**Lecture / Practice (VÜ)**

**Learning Content**

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

**Elective literature:**

7 COURSES

T 7.370 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 - Fahrzeugentwicklung
M-MACH-101267 - Mobile Arbeitsmaschinen

Events

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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.

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-MACH-108888 - Simulation of Coupled Systems - Advance must have been passed.

Recommendation

- Knowledge of ProE (ideally in actual version)
- Basic knowledge of Matlab/Simulink
- Basic knowledge of dynamics of machines
- 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 hydraulic 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 regarding this course:

**Simulation of Coupled Systems**

2114095, SS 2019, 2 SWS, [Open in study portal](#)

**Lecture (V)**

**Learning 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

**Workload**

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

**Literature**

**Elective literature:**

- miscellaneous guides according the software-tools pdf-shaped
- information to the wheel-type loader
7.371 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 - Fahrzeugentwicklung

### Type
- Studienleistung

### Credits
- 0

### Recurrence
- Each summer term

### Version
- 1

**Competence Certificate**
Preparation of semester report

**Prerequisites**
none
7.372 Course: Simulation of Stochastic Systems [T-WIWI-106552]

**Responsible:** Prof. Dr. Oliver Grothe
Prof. Dr. Steffen Rebennack

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103289 - Stochastische Optimierung

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**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.
7.373 Course: Site Management [T-BGU-103427]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101884 - Lean Management im Bauwesen
- M-BGU-101888 - Projektmanagement im Bauwesen

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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7.374 Course: Smart Energy Infrastructure [T-WIWI-107464]

**Responsible:** Dr. Armin Ardone  
Dr. Dr. Andrej Marko Pustisek

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101452 - Energiewirtschaft und Technologie

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**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
None.

**Annotation**
7.375 Course: Smart Grid Applications [T-WIWI-107504]

**Responsible:** Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103720 - eEnergy: Markets, Services and Systems

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### Events

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<td>2540453</td>
<td>Übung zu Smart Grid Applications</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Staudt, Mengelkamp</td>
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### Competence Certificate

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

### Prerequisites

None

### Recommendation

None

### Annotation

The lecture will be read for the first time in winter term 2018/19.
7.376 Course: Social Choice Theory [T-WIWI-102859]

**Responsible:** Prof. Dr. Clemens Puppe

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101500 - Microeconomic Theory
- M-WIWI-101504 - Collective Decision Making

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**Events**

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<td>Practice (Ü) Puppe, Müller</td>
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**Competence Certificate**

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None

Below you will find excerpts from events regarding this course:

**Social Choice Theory**

2520537, SS 2019, 2 SWS, Open in study portal

**Learning Content**

The course provides a comprehensive treatment of preference and judgement aggregation, including proofs of general results that have Arrow’s famous impossibility theorem and Gibbard’s oligarchy theorem as corollaries. The second part of the course is devoted to voting theory. Among other things, we prove the Gibbard-Satterthwaite theorem.

**Workload**

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

**Literature**

Main texts:


Secondary texts:

Course: Sociotechnical Information Systems Development [T-WIWI-109249]

**Responsible:** Prof. Dr. Ali Sunyaev

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

**Type:** Prüfungsleistung anderer Art

**Credits:** 4

**Recurrence:** Each term

**Version:** 1

**Events**

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<td>Each term</td>
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<td>Prüfungsleistung anderer Art</td>
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</table>

**Competence Certificate**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of an implementation and a final thesis documenting the development and use of the application.

**Prerequisites**
None.

Below you will find excerpts from events regarding this course:

**Entwicklung Soziotechnischer Informationssysteme**

2512400, WS 18/19, SWS, Open in study portal

**Practical course (P)**

**Description**
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

**Workload**
4 ECTS = approx. 120 h
7.378 Course: Software Quality Management [T-WIWI-102895]

**Responsible:** Prof. Dr. Andreas Oberweis

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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**Events**

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**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**

None

**Annotation**

This course was formerly named “Software Technology: Quality Management”.

*Below you will find excerpts from events regarding this course:*

**Software Quality Management**

2511208, SS 2019, 2 SWS, [Open in study portal](#)

**Learning Content**

This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

**Annotation**

This course was formerly named “Software Technology: Quality Management”.

**Workload**

- Lecture 30h
- Exercise 15h

- Preparation of lecture 30h
- Preparation of exercises 30h
- Exam preparation 44h
- Exam 1h

Total: 150h
Literature

- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Further literature is given in lectures.
Course: Spatial Economics [T-WIWI-103107]

**Responsible:** Prof. Dr. Ingrid Ott

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101485 - Verkehrinfrastrukturpolitik und regionale Entwicklung
- M-WIWI-101496 - Wachstum und Agglomeration
- M-WIWI-101497 - Agglomeration und Innovation

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**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required. The attendance of the course Introduction to economic policy [2560280] is recommended.

**Annotation**
Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.
7.380 Course: Special Topics in Highway Engineering and Environmental Impact Assessment [T-BGU-101860]

**Responsible:** Prof. Dr.-Ing. Ralf Roos

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-100999 - Straßenwesen

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<td>Besondere Kapitel im Straßenwesen</td>
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<td>Roos</td>
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</table>

**Competence Certificate**
oral exam with 15 minutes

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7.381 Course: Special Topics in Information Systems [T-WIWI-109940]

**Responsible:** Prof. Dr. Christof Weinhardt

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-101411 - Information Engineering
- M-WIWI-101506 - Service Analytics

**Type:** Prüfungsleistung anderer Art  
**Credits:** 4,5  
**Recurrence:** Each term  
**Version:** 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 (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

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The course T-WIWI-102706 - Special Topics in Information Engineering & Management must not have been started.

**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.
7.382 Course: Special Topics of Enterprise Information Systems [T-WIWI-102676]

- **Responsible:** Prof. Dr. Andreas Oberweis
- **Organisation:** KIT Department of Economics and Management
- **Part of:**
  - M-WIWI-101472 - Informatik
  - M-WIWI-101628 - Vertiefung Informatik
  - M-WIWI-101630 - Wahlpflicht Informatik

**Type**
- Prüfungsleistung schriftlich

**Credits**
- 5

**Recurrence**
- Each term

**Version**
- 1

**Events**
| WS 18/19 | 2511228 | Spezialvorlesung Betriebliche Informationssysteme: Industrie 4.0 | 2 SWS | Lecture (V) | Koschmider |

**Competence Certificate**
The assessment of this course is a written examination (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Please note that the exam "Special Lecture on Business Information Systems: Industry 4.0" will be offered for the last time in summer semester 2019 (only for repeaters).

**Prerequisites**
- None
## Course: Specialization in Food Process Engineering [T-CIWVT-101875]

**Responsible:** Dr. Volker Gaukel

**Organisation:** KIT Department of Chemical and Process Engineering

**Part of:** M-CIWVT-101119 - Vertiefung Lebensmittelverfahrenstechnik

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### Events

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**Prerequisites**

The Module "Principles of Food Process Engineering" must be passed.

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The module M-CIWVT-101120 - Principles of Food Process Engineering must have been passed.
Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

**Responsible:** Dr. Wolf-Dieter Heller

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101638 - Ökonometrie und Statistik I
- M-WIWI-101639 - Ökonometrie und Statistik II

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**Events**

| WS 18/19 | 2521350 | Statistische Modellierung von Allgemeinen Regressionsmodellen | 2 SWS | Lecture (V) | 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 regarding this course:

**Annotation**
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

**Workload**
The total workload for this course is approximately 135 hours (4.5 credits).
- regular attendance: 30 hours
- self-study: 65 hours
- exam preparation: 40 hours
7.385 Course: Stochastic Calculus and Finance [T-WIWI-103129]

Responsible: Dr. Mher Safarian  
Organisation: KIT Department of Economics and Management  
Part of: M-WIWI-101639 - Ökonometrie und Statistik II

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Events

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Competence Certificate
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (3) SPO).

Prerequisites
None

Annotation
For more information see http://statistik.econ.kit.edu/

Below you will find excerpts from events regarding this course:

Stochastic Calculus and Finance  
2521331, WS 18/19, 2 SWS, Open in study portal

Description
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:

Learning Content
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:


Stochastic processes (Poisson-process, Brownian motion, martingales), stochastic Integral (Integral, quadratic und co-variation, Ito-formula), stochastic differential equation for price-processes, trading strategies, option pricing (Feynman-Kac), neutral risk rating (equivalent martingale measure, Girsanov theorem), term structure models

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

Literature
To be announced in lecture.

Elective literature:

- An Introduction to Stochastic Integration (Probability and its Applications) by Kai L. Chung, Ruth J. Williams, Birkhaueser,
- Methods of Mathematical Finance by Ioannis Karatzas, Steven E. Shreve, Springer 1998
7.386 Course: Strategic Management of Information Technology [T-WIWI-102669]

Responsible: Thomas Wolf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik
           M-WIWI-101628 - Vertiefung Informatik
           M-WIWI-101630 - Wahlpflicht Informatik

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<td>2511603</td>
<td>Übungen zu Strategisches Management der betrieblichen Informationsverarbeitung 1 SWS Practice (Ü) Wolf</td>
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Competence Certificate
The assessment of this course is a written (60 min.) or (if necessary) oral examination according (30 min.) to §4(2) of the examination regulation.

Prerequisites
None

Below you will find excerpts from events regarding this course:

V Strategic Management of Information Technology
2511602, SS 2019, 2 SWS, Open in study portal

Learning Content
The following topics will be covered: strategic planning of ICT, architecture of ICT, overall planning of ICT, outsourcing, operation and controlling of ICT.

Literature
7.387 Course: Strategic Transport Planning [T-BGU-103426]

**Responsible:** Volker Waßmuth

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101064 - Grundlagen des Verkehrswesens
- M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Events**

| SS 2019 | 6232808 | Strategische Verkehrsplanung | 2 SWS | Lecture (V) | Waßmuth |

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
Course: Strategy and Management Theory: Developments and “Classics” [T-WIWI-106190]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Strategie und Management: Fortgeschrittene Themen

**Type**
Prüfungsleistung anderer Art

**Credits**
3

**Recurrence**
Irregular

**Version**
1

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

**Prerequisites**
None

**Recommendation**
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

*Below you will find excerpts from events regarding this course:*

**Strategy and Management Theory: Developments and “Classics”**
2577922, WS 18/19, 2 SWS, [Open in study portal](#)

Notes
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

Learning Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.
- Lecture: 15 hours
- Preparation of lecture: 75 hours
- Exam preparation: n/a

**Workshop aktuelle Themen Strategie und Management (Master)**
2577923, SS 2019, 2 SWS, [Open in study portal](#)
Notes
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

Learning Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a
7.389 Course: Structural and Phase Analysis [T-MACH-102170]

**Responsible:** Dr.-Ing. Susanne Wagner

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Competence Certificate**

Oral examination

**Prerequisites**

none

Below you will find excerpts from events regarding this course:

**Structural and phase analysis**

2125763, WS 18/19, 2 SWS, Open in study portal

**Lecture (V)**

**Learning Content**

The course gives an overview to generation and detection of x-rays as well as their interaction with matter. It provides an introduction to crystallography and describes modern measurement and analysis methods of x-ray diffraction.

It is arranged in the following units:

- Generation and properties of X-Ray's
- Crystallography
- Fundamentals and application of different measuring methods
- Qualitative and quantitative phase analysis
- Texture analysis (pole figures)
- Residual stress measurements

**Workload**

regular attendance: 30 hours

self-study: 90 hours

**Literature**

1. Moderne Röntgenbeugung - Röntgendiffрактометрия für Materialwissenschaftler, Physiker und Chemiker, Spieß, Lothar / Schwarzer, Robert / Behnken, Herfried / Teichert, Gerd B.G. Teubner Verlag 2005
Course: Structural Ceramics [T-MACH-102179]

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

Part of: M-MACH-101268 - Spezielle Werkstoffkunde

<table>
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Events

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<td>4</td>
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</table>

Competence Certificate

Oral examination, 20 min

Prerequisites

none

Below you will find excerpts from events regarding this course:

Description

Media:
Slides for the lecture:
available under http://www.iam.kit.edu/km

Learning Content

The lecture gives an overview on structure and properties of the technical relevant structural ceramics silicon nitride, silicon carbide, alumina, zirconia, boron nitride and fibre-reinforced ceramics. All types of structural ceramics will be discussed in detail in terms of preparation methods of the raw materials, shaping techniques, densification, microstructural development, mechanical properties and application fields.

Annotation

The course will not take place every year.

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature


7.391 Course: Superhard Thin Film Materials [T-MACH-102103]

**Responsible:** Prof. Dr. Sven Ulrich

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**

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<td>WS 18/19</td>
<td>2177618</td>
<td>Superhard Thin Film Materials</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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</table>

**Competence Certificate**
oral examination (ca. 30 Minuten)

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

**Superhard Thin Film Materials**

2177618, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**

**Introduction**

Basics

Plasma diagnostics

Particle flux analysis

Sputtering and ion implantation

Computer simulations

Properties of materials, thin film deposition technology, thin film analysis and modelling of superhard materials

Amorphous hydrogenated carbon

Diamond like carbon

Diamond

Cubic Boronitride

Materials of the system metall-boron-carbon-nitrogen-silicon

**Workload**

regular attendance: 22 hours
self-study: 98 hours

**Literature**

G. Kienel (Ed.): Vakuumbeschichtung 1 - 5, VDI Verlag, Düsseldorf, 1994

Copies with figures and tables will be distributed
7.392 Course: Supplementary Claim Management [T-BGU-103428]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101888 - Projektmanagement im Bauwesen

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**Events**

| SS 2019 | 6241811 | Nachtragsmanagement | 1 SWS | Lecture (V) | Haghsheno, Pietsch |

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.393 Course: Supply Chain Management [T-MACH-105181]

**Responsible:** Dr.-Ing. Knut Alicke
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101280 - Logistik in Wertschöpfungsnetzwerken

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<td>WS 18/19 2117063</td>
<td>Übungen zu ‘Supply chain management’ (mach und wiwi)</td>
<td>1</td>
<td>Practice (Ü)</td>
<td>Alicke</td>
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</table>

**Competence Certificate**
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

**Supply chain management**
2117062, WS 18/19, 3 SWS, Open in study portal

**Description**

**Media:**
presentations

**Learning Content**
- Bullwhip-Effect, Demand Planning & Forecasting
- Conventional planning processes (MRP + MRPIII)
- Stock keeping strategy
- Data acquisition and analysis
- Design for logistics (Postponement, Mass Customization, etc.)
- Logistic partnerships (VMI, etc.)
- Distribution structures (central vs. distributed, Hub&Spoke)
- SCM-metrics (performance measurement) e-business
- Special sectors as well as guest lectures

**Workload**
regular attendance: 42 hours
self-study: 138 hours

**Literature**
Alicke, K.: Planung und Betrieb von Logistiknetzwerken
Simchi-Levi, D., Kaminsky, P.: Designing and Managing the Supply Chain
Goldratt, E., Cox, J.: The Goal
7.394 Course: Supply Chain Management in the Automotive Industry [T-WIWI-102828]

Responsible: Tilman Heupel
Hendrik Lang

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101412 - Industrielle Produktion III
M-WIWI-101471 - Industrielle Produktion II

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Events

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<th>Recurrence</th>
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</tr>
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<tr>
<td>WS 18/19 2581957</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Lang, Heupel</td>
</tr>
</tbody>
</table>

Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events regarding this course:

Supply Chain Management in the automotive industry
2581957, WS 18/19, 2 SWS, Open in study portal

Learning Content

- Automotive industry significance
- The automotive supply chain
- Adding value structures of the automotive supply chain and mastering of the production systems as factors of success in the SCM
- Strategic procurement logistics
- Risk management
- Quality engineering and management in the automotive supply chain
- Cost engineering and management in the automotive supply chain
- Purchasing (Supplier selection, contract management)
- Performance measurement of the supply chain / organization

Annotation
None.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be announced in the course.
7.395 Course: Supply Chain Management in the Process Industry [T-WIWI-102860]

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-102805 - Service Operations

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<td>Each winter term</td>
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**Competence Certificate**
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation) (individual grading), case study presentation by student teams (team grading) and classroom participation (individual grading). The examination is held in the term of the lecture.

**Prerequisites**
None

**Recommendation**
Basic knowledge as conveyed in the module Introduction to Operations Research is assumed. Advanced knowledge of Operations Research (e.g., as conveyed in the lectures Facility Location and Strategic SCM, Tactical and operational SCM) is recommended.

**Annotation**
The number of participants is restricted due to the execution of interactive case studies and the resulting examination effort. Due to these capacity restrictions, registration before course start is required according to the information on the course website. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

**Below you will find excerpts from events regarding this course:**

<table>
<thead>
<tr>
<th>Event Details</th>
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<tbody>
<tr>
<td>Supply Chain Management in the Process Industry</td>
<td>Blackburn</td>
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</table>

**Learning Content**
The course “Supply Chain Management in the Process Industry” covers fundamental concepts in the field of supply chain management with special focus on process industry. Strategic, planning and operational topics within the end-to-end supply chain are examined, covering relevant approaches in design, processes and performance measurement. Additional focus within the course is on showing the interdisciplinary linkages SCM has with information systems, performance management, project management, risk management and sustainability management. The course is enriched by various insights from the world’s leading chemical company BASF, provided by executive management as real life examples and cases.

**Annotation**
The number of participants is restricted due to the execution of interactive case studies and the resulting examination effort. Due to these capacity restrictions, registration before course start is required according to the information on the course website. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

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

- Various case studies, which will be provided during the course
Course: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]

**Responsible:** Claus J. Bosch  
Dr. Mathias Göbelt

**Organisation:** KIT Department of Economics and Management

**Part of:**  
M-WIWI-101412 - Industrielle Produktion III  
M-WIWI-101471 - Industrielle Produktion II

<table>
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**Events**

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<th>Code</th>
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<td>2581961</td>
<td>Supply Chain Management with Advanced Planning Systems</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Göbelt, Bosch</td>
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</table>

**Competence Certificate**
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

Below you will find excerpts from events regarding this course:

**Supply Chain Management with Advanced Planning Systems**

Lecture (V)

2581961, SS 2019, 2 SWS, [Open in study portal]

**Learning Content**

1. **Introduction to Supply Chain Management**
   1.1. Supply Chain Management Fundamentals  
   1.2. Supply Chain Management Analytics

2. **Structure of Advanced Planning Systems**

3. **SAP SCM**
   3.1. Introduction / SCM Solution Map  
   3.2. Demand Planning  
   3.3. Supply Network Planning  
   3.4. Production Planning and Detailed Scheduling  
   3.5. Deployment  
   3.6. Transportation Planning and Vehicle Scheduling  
   3.7. [Optional] Global Available to Promise

4. **SAP SCM in Practice**
   4.1. Success Stories  
   4.2. SAP Implementation Methodology

**Annotation**
This lecture has 3.5 Credits since summer term 2014.

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.
Literature
will be announced in the course
7 COURSES

Course: Systematic Materials Selection [T-MACH-100531]

Responsible: Dr.-Ing. Stefan Dietrich
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101268 - Spezielle Werkstoffkunde

7.397 Course: Systematic Materials Selection [T-MACH-100531]

Type: Prüfungsleistung schriftlich
Credits: 5
Recurrence: Each summer term
Version: 2

Events

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<td>Systematic Materials Selection</td>
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<td>SS 2019</td>
<td>2174577</td>
<td>Übungen zu ‘Systematische Werkstoffauswahl’</td>
<td>Ü</td>
<td>1 SWS</td>
<td>Dietrich, Mitarbeiter</td>
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</table>

Competence Certificate
The assessment is carried out as a written exam of 2 h.

Prerequisites
None.

Recommendation
It is strongly recommended to pass the two courses "Materials Science I" (T-MACH-102078) and "Materials Science II" (T-MACH-102079).

Below you will find excerpts from events regarding this course:

Systematic Materials Selection
2174576, SS 2019, 3 SWS, Open in study portal

Learning Content
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are developed. 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

Workload
The workload for the lecture is 150 h per semester and consists of the presence during the lecture (30 h) as well as preparation and rework time at home (120 h).

Literature
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
7.398 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-102832 - Operations Research im Supply Chain Management

**Type**
- Prüfungsleistung schriftlich

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 2

**Events**

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<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Pomes</td>
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</table>

**Competence Certificate**

The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

**Prerequisite**

Prerequisite for admission to examination is the successful completion of the online assessments.

**Prerequisites**

Prerequisite for admission to examination is the successful 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 regarding this course:

**Taktisches und operatives SCM**

2550486, SS 2019, 2 SWS, [Open in study portal](#)

**Lecture (V)**

**Description**

Since the classical work 'Theory of the Location of Industries' of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategic logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.

Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

**Learning Content**

The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models). The exercises accompanying the lecture offer the possibility to apply the considered models to practical problems.

**Annotation**

The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.
Literature

Elective Literature

- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
7.399 Course: Tax Law I [T-INFO-101315]

**Responsible:** Prof. Dr. Thomas Dreier

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101216 - Recht der Wirtschaftsunternehmen

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**Events**

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<td>24168</td>
<td>Tax Law I</td>
<td>2 SWS</td>
<td>Dietrich</td>
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</table>
### 7.400 Course: Tax Law II [T-INFO-101314]

**Responsible:** Detlef Dietrich  
Prof. Dr. Thomas Dreier

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101216 - Recht der Wirtschaftsunternehmen

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**Events**

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<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Dietrich</td>
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</table>
7.401 Course: Technical Conditions Met [T-WIWI-106623]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Angewandte strategische Entscheidungen

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</table>

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
7.402 Course: Technologies for Innovation Management [T-WIWI-102854]

**Responsible:** Dr. Daniel Jeffrey Koch  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101507 - Innovationsmanagement  
- M-WIWI-101507 - Innovationsmanagement

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**Events**

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<td>WS 18/19 2545106</td>
<td>2 SWS</td>
<td>Block (B)</td>
<td>Koch</td>
</tr>
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</table>

**Competence Certificate**

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovationsmanagement: Konzepte, Strategien und Methoden [2545015] is recommended.

Below you will find excerpts from events regarding this course:

**Technologien für das Innovationsmanagement**

<table>
<thead>
<tr>
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<th>Credits</th>
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</table>

**Learning Content**
The seminar "Technologies for Innovation Management" will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

**Literature**
Will be announced in the first session.
7.403 Course: Technology Assessment [T-WIWI-102858]

**Responsible:** Dr. Daniel Jeffrey Koch

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101507 - Innovationsmanagement

<table>
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<td>Prüfungsleistung anderer Art</td>
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<td>Each summer term</td>
<td>1</td>
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</table>

**Competence Certificate**

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management [2545015] is recommended.

**Annotation**
See German version.
### Course: Telecommunication and Internet Economics [T-WIWI-102713]

**Responsible:** Prof. Dr. Kay Mitusch  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101406 - Netzwerkökonomie  
- M-WIWI-101409 - Electronic Markets

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**Events**

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<td>2561232</td>
<td>Telecommunication and Internet Economics</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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<td>Übung zu Telekommunikations- und Internetökonomie</td>
<td>1 SWS</td>
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**Competence Certificate**

Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

**Prerequisites**

None

**Recommendation**

Basic knowledge and skills of microeconomics from undergraduate studies (bachelor’s degree) are expected. Particularly helpful but not necessary: Industrial Economics. Prior attendance of the lecture „Competition in Networks“ [26240] or “Industrial Organisation” is helpful in any case but not considered a formal precondition. The english taught course "Communications Economics" is complementary and recommendet for anyone interested in the sector.

**Below you will find excerpts from events regarding this course:**

### Lecture (V)

**Telecommunication and Internet Economics**  
2561232, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**

Among the network sectors the telecommunication and internet sector is the most dynamic one and the one with and highest variety of phenomena. Problems of natural monopoly still exist in some parts. But there is also competition, not only at the service level but also at the infrastructural level. Both levels are characterized by (vertical) quality differentiations and by high technology dynamics. What should the regulation of this sector look like? How should the mutual network access prices of two telecommunication providers be regulated and how can regulators set incentives for infrastructure investments?

The internet is a free market par excellence, because everybody can open internet businesses without high entry costs. Why then can a company like ebay dominate the market for internet-auction platforms so strongly? The causes of market concentration on the internet will be analyzed. So will be the economic implications of the Next Generations Networks.

**Workload**

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

**Literature**


Further literature will be provided during the lecture.
7.405 Course: Telecommunications Law [T-INFO-101309]

Responsible: Prof. Dr. Nikolaus Marsch
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Öffentliches Wirtschaftsrecht

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</table>
Course: Tendering, Planning and Financing in Public Transport [T-BGU-101005]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101064 - Grundlagen des Verkehrswesens
- M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Events**

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**Competence Certificate**

oral exam, appr. 20 min.

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
### Course: Theory of Endogenous Growth [T-WIWI-102785]

<table>
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<tr>
<th>Responsible:</th>
<th>Prof. Dr. Ingrid Ott</th>
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| Part of:           | M-WIWI-101478 - Innovation und Wachstum  
                       M-WIWI-101496 - Wachstum und Agglomeration |

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**Competence Certificate**

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

**Prerequisites**

None

**Recommendation**

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

**Annotation**

Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.
### 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 - Fahrzeugentwicklung

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#### Competence Certificate

- **Oral Examination**  
  - **Duration:** 30 up to 40 minutes  
  - **Auxiliary means:** none

#### Prerequisites

- **none**

Below you will find excerpts from events regarding this course:

**Tires and Wheel Development for Passenger Cars**  
2114845, SS 2019, 2 SWS, [Open in study portal](#)

#### Learning 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 including Design and manufacturing methods, Wheeltesting  
7. Tire pressure: Indirect and direct measuring systems  
8. Tire testing subjective and objective

#### Workload

- **regular attendance:** 22.5 hours  
- **self-study:** 97.5 hours

#### Literature

- **Manuscript** to the lecture
7.409 Course: Topics in Experimental Economics [T-WIWI-102863]

**Responsible:** Prof. Dr. Johannes Philipp Reiß

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101505 - Experimentelle Wirtschaftsforschung

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**Competence Certificate**
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

**Annotation**
The course is offered in summer 2020 for the next time, not in summer 2018.
# 7.410 Course: Trademark and Unfair Competition Law [T-INFO-101313]

**Responsible:** Dr. Yvonne Matz  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101215 - Recht des Geistigen Eigentums

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Industrial Engineering and Management M.Sc.  
Module Handbook as of 04.03.2019
7.411 Course: Traffic Engineering [T-BGU-101798]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
### 7.412 Course: Traffic Flow Simulation [T-BGU-101800]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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<td>Simulation von Verkehr</td>
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**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
### Course: Traffic Management and Transport Telematics [T-BGU-101799]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
Course: Transport Economics [T-WIWI-100007]

Responsible: Prof. Dr. Kay Mitusch
Dr. Eckhard Szimba

Organisation: KIT Department of Economics and Management

Part of:
M-WIWI-101406 - Netzwerkökonomie
M-WIWI-101468 - Umwelt- und Ressourcenökonomie
M-WIWI-101485 - Verkehrsinfrastrukturpolitik und regionale Entwicklung

Type: Prüfungsleistung schriftlich
Credits: 4,5
Recurrence: Each summer term
Version: 1

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Competence Certificate
The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

Below you will find excerpts from events regarding this course:

Transport Economics
2560230, SS 2019, SWS, Open in study portal

Learning Content
The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticans and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport
- empirical analysis of transport demand
- assessment of transport infrastructure projects
- external effects in transport
- transport policy
- cost structures of transport infrastructure
- Project evaluation from the perspective of the public sector

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

Literature
Will be announced in the lecture.
(for literature to prepare the lecture - see additional literature)

Literature:
7.415 Course: Transportation Data Analysis [T-BGU-100010]

**Responsible:** Dr.-Ing. Martin Kagerbauer

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101065 - Verkehrsmodellierung und Verkehrsmanagement

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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.416 Course: Transportation Systems [T-BGU-106610]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101064 - Grundlagen des Verkehrswesens

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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
## 7.417 Course: Tunnel Construction and Blasting Engineering [T-BGU-101846]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101110 - Verfahrenstechnik im Baubetrieb

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**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
### 7.418 Course: Turnkey Construction I - Processes and Methods [T-BGU-103430]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101884 - Lean Management im Bauwesen  
- M-BGU-101888 - Projektmanagement im Bauwesen

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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
Course: Turnkey Construction II - Trades and Technology [T-BGU-103431]

7.419 Course: Turnkey Construction II - Trades and Technology [T-BGU-103431]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101884 - Lean Management im Bauwesen
- M-BGU-101888 - Projektmanagement im Bauwesen

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**Events**

| SS 2019 | 6241809 | Schlüsselfertiges Bauen II (Gewerke und Technik) | 2 SWS | Lecture / Practice (VÜ) | Teizer, Denzer |

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
### 7.420 Course: Urban Water Infrastructure and Management [T-BGU-106600]

**Responsible:** Dr.-Ing. Stephan Fuchs  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101001 - Water Supply and Sanitation (Wasserver- und entsorgung)  
- M-BGU-104448 - Urban Water Technologies

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**Competence Certificate**  
written exam, 60 min.

**Prerequisites**  
none

**Recommendation**  
none

**Annotation**  
none
7.421 Course: Valuation [T-WIWI-102621]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
         M-WIWI-101482 - Finance 1
         M-WIWI-101483 - Finance 2
         M-WIWI-101510 - Cross-Functional Management Accounting

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Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events regarding this course:

**Description**
Firms prosper when they create value for their shareholders and stakeholders. This is achieved by investing in projects that yield higher returns than their according cost of capital. Students are told the basic tools for firm and project valuation as well as ways to implement these tools in order to enhance a firm's value and improve its investment decisions. Among other things, the course will deal with the valuation of firms and individual projects using discounted cash flow and relative valuation approaches and the valuation of flexibility deploying real options.

**Learning Content**
Topics:
- Projections of cash flows
- Estimation of the cost of capital
- Valuation of the firm
- Mergers and acquisitions
- Real options

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

Part of: M-MACH-101264 - Fahrzeugeigenschaften

Events

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Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes
Auxiliary means: none

Prerequisites
Can not be combined with lecture T-MACH-102206

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-102206 - Vehicle Ride Comfort & Acoustics I must not have been started.

Below you will find excerpts from events regarding this course:

Learning 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 chassis 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.

Workload
regular attendance: 22,5 hours
self-study: 97,5 hours
Literature
2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

The script will be supplied in the lectures

Learning 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.

Workload
regular attendance: 22,5 hours
self-study: 97,5 hours

Literature
2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

The script will be supplied in the lectures
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 - Fahrzeugeigenschaften

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**Competence Certificate**

Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

**Prerequisites**

Can not be combined with lecture T-MACH-102205

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-MACH-102205 - Vehicle Ride Comfort & Acoustics II must not have been started.

**Below you will find excerpts from events regarding this course:**

**Vehicle Comfort and Acoustics II**

2114825, SS 2019, 2 SWS, [Open in study portal](#)

**Learning 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
Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature
The script will be supplied in the lectures.

Vehicle Ride Comfort & Acoustics II
2114857, SS 2019, 2 SWS, Open in study portal

Notes
The lecture starts in June 2016. Exact date of beginning: see homepage of institute.

Learning 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

Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature
The script will be supplied in the lectures.
7.424 Course: Vehicle Mechatronics I [T-MACH-105156]

**Responsible:** Prof. Dr.-Ing. Dieter Ammon  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
- M-MACH-101264 - Fahrzeugeigenschaften  
- M-MACH-101265 - Fahrzeugentwicklung

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**Competence Certificate**  
Written examination

**Duration:** 90 minutes

**Auxiliary means:** none

**Prerequisites**  
none

_Below you will find excerpts from events regarding this course:_

**Vehicle Mechatronics I**  
2113816, WS 18/19, 2 SWS, [Open in study portal]

**Learning Content**  
1. Introduction: Mechatronics in vehicle technology  
2. Vehicle Control systems  
   Brake- and traction controls (ABS, ASR, automated power train controls)  
   Active and semiactive suspension systems, active stabilizer bars  
   Vehicle dynamics controls, driver assistance systems  
3. Modelling technology  
   Mechanics - multi body dynamics  
   Electrical and electronic systems, control systems  
   Hydraulics  
   Interdisciplinary coupled systems  
4. Computer simulation technology  
   Numerical integration methods  
   Quality (validation, operating areas, accuracy, performance)  
   Simulator-coupling (hardware-in-the-loop, software-in-the-loop)  
5. System design (example: brake control)  
   Demands, requirements (funktion, safety, robustness)  
   Problem setup (analysis - modelling - model reduction)  
   Solution approaches  
   Evaluation (quality, efficiency, validation area, concept ripeness)

**Workload**  
regular attendance: 22.5 hours  
self-study: 97.5 hours
Literature
1. Ammon, D., Modellbildung und Systementwicklung in der Fahrzeugdynamik, Teubner, Stuttgart, 1997
5. Roddeck, W., Einführung in die Mechatronik, Teubner, Stuttgart, 1997
Course: Virtual Engineering I [T-MACH-102123]

**Responsible:** Prof. Dr.-Ing. Jivka Ovtcharova

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101283 - Virtual Engineering A

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**Competence Certificate**
Written examination 90 min.

**Prerequisites**
None

Below you will find excerpts from events regarding this course:

### Virtual Engineering I
2121352, WS 18/19, 2 SWS, [Open in study portal](#)

**Description**

**Media:**
Lecture notes

**Learning Content**
The lecture communicates IT aspects required for understanding virtual product development processes. For this purpose, the focus is set on systems used in industry supporting the process chain of Virtual Engineering:

- Product Lifecycle Management is an approach for managing product related data across the entire lifecycle of the product, beginning with the concept phase until disassembling and recycling.
- CAx-systems for virtual product development allow modeling digital products regarding design, construction, manufacturing and maintenance.
- Validation systems enable the analysis of products regarding statics, dynamics, safety and manufacturing feasibility.

The objective of the lecture is to clarify the relationship between construction and validation operations by applying virtual prototypes and VR/AR/MR visualization techniques in combination with PDM/PLM-systems. This is taught by introducing each particular system in applied exercises.

### Exercises Virtual Engineering I
2121353, WS 18/19, 2 SWS, [Open in study portal](#)

**Learning Content**
In this module, the practical application of different CAx software systems is exemplarily conducted in small groups, the main focus being the CAD systems CATIA V5 (DASSAULT SYSTEMES) and NX 5 (Siemens PLM Software).

**Workload**
Regular attendance: 31,5 hours, self-study: 10,5 hours
Literature
Exercise notes
**7.426 Course: Virtual Engineering II [T-MACH-102124]**

**Responsible:** Prof. Dr.-Ing. Jivka Ovtcharova  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101281 - Virtual Engineering B

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**Competence Certificate**  
Written examination 90 min.

**Prerequisites**  
None

*Below you will find excerpts from events regarding this course:*

**Virtual Engineering II**  
2122378, SS 2019, 2 SWS, [Open in study portal](#)  

**Description**  
Media: Lecture notes

**Learning Content**  
The lecture presents the IT aspects required for understanding virtual product development processes:

- Corresponding models can be visualized in Virtual Reality Systems, from individual parts to complete assemblies.
- Virtual Prototypes combine CAD-data and information about properties of components and assemblies for immersive visualization, functionality tests and functional validation in VR/AR/MR environments.
- Integrated Virtual Product Development explains product development processes from the point of view of Virtual Engineering.

The objective of this lecture is to clarify the relationship between construction and validation operations by using virtual prototypes and VR/AR/MR visualization techniques in combination with PDM/PLM-systems. This will be achieved by introducing each particular IT-system with practical-oriented exercises.
### 7.427 Course: Virtual Engineering Lab [T-MACH-106740]

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

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

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**Competence Certificate**  
Assessment of another type (graded), procedure see webpage.
7.428 Course: Virtual training factory 4.X [T-MACH-106741]

**Responsible:** Prof. Dr.-Ing. Jivka Ovtcharova

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

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**Competence Certificate**
Assessment of another type (graded), procedure see webpage.
7.429 Course: Warehousing and Distribution Systems [T-MACH-105174]

**Responsible:** Prof. Dr.-Ing. Kai Furmans

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101263 - Einführung in die Logistik
- M-MACH-101277 - Materialfluss in Logistiksystemen
- M-MACH-101278 - Materialfluss in vernetzten Logistiksystemen
- M-MACH-101279 - Technische Logistik
- M-MACH-101280 - Logistik in Wertschöpfungsnetzwerken

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**Competence Certificate**
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

**Prerequisites**
none

Below you will find excerpts from events regarding this course:

**Warehousing and distribution systems**
2118097, SS 2019, 2 SWS, Open in study portal

**Description**
**Media:**
presentations, black board

**Learning Content**
- Introduction
- Yard management
- Receiving
- Storage and picking
- Workshop on cycle times
- Consolidation and packing
- Shipping
- Added Value
- Overhead
- Case Study: DCRM
- Planning of warehouses
- Case study: Planning of warehouses
- Distribution networks
- Lean Warehousing

**Annotation**
none

**Workload**
regular attendance: 21 hours
self-study: 99 hours
Literature

ARNOLD, Dieter, FURMANS, Kai (2005)
Materialfluss in Logistiksystemen, 5. Auflage, Berlin: Springer-Verlag

ARNOLD, Dieter (Hrsg.) et al. (2008)
Handbuch Logistik, 3. Auflage, Berlin: Springer-Verlag

Warehouse Science

GUDEHUS, Timm (2005)
Logistik, 3. Auflage, Berlin: Springer-Verlag

FRAZELLE, Edward (2002)
World-class warehousing and material handling, McGraw-Hill

MARTIN, Heinrich (1999)
Praxiswissen Materialflußplanung: Transport, Hanshaben, Lagern, Kommissionieren, Braunschweig, Wiesbaden: Vieweg

WISER, Jens (2009)
Der Prozess Lagern und Kommissionieren im Rahmen des Distribution Center Reference Model (DCRM); Karlsruhe: Universitätsverlag

A comprehensive overview of scientific papers can be found at:

ROODBERGEN, Kees Jan (2007)
Warehouse Literature
# 7.430 Course: Wastewater and Storm Water Treatment Facilities for Industrial Engineers [T-BGU-109051]

**Responsible:** Dr.-Ing. Stephan Fuchs  
Dr.-Ing. Tobias Morck  

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  

**Part of:** M-BGU-104448 - Urban Water Technologies

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**Competence Certificate**  
report on field trips, appr. 8-15 pages

**Prerequisites**  
none

**Recommendation**  
none

**Annotation**  
none
### 7.431 Course: Water Chemistry and Water Technology I [T-CIWVT-101900]

**Responsible:** Prof. Dr. Harald Horn  
**Organisation:** KIT Department of Chemical and Process Engineering  
**Part of:** M-CIWVT-101121 - Wasserchemie und Wassertechnologie I

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**Prerequisites**
T-CIWVT-103351 - Wasserchemisches Praktikum must be passed.
7 COURSES

Course: Water Chemistry and Water Technology II [T-CIWVT-101901]

**Responsible:** Prof. Dr. Harald Horn

**Organisation:** KIT Department of Chemical and Process Engineering

**Part of:** M-CIWVT-101122 - Wasserchemie und Wassertechnologie II

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**Prerequisites**
The module “Water Chemistry and Water Technology I” must be passed.

**Modeled Conditions**
The following conditions have to be fulfilled:

1. The module M-CIWVT-101121 - Water Chemistry and Water Technology I must have been passed.
7.433 Course: Web Science [T-WIWI-103112]

**Responsible:** Prof. Dr. York Sure-Vetter

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatik
- M-WIWI-101628 - Vertiefung Informatik
- M-WIWI-101630 - Wahlpflicht Informatik

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**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation. The exam takes place every semester and can be repeated at every regular examination date.

**Prerequisites**

None

**Annotation**


*Below you will find excerpts from events regarding this course:*

**Web Science**

2511312, WS 18/19, 2 SWS, [Open in study portal](#)

**Description**

Web Science is the emergent study of the people and technologies, applications, processes and practices that shape and are shaped by the World Wide Web. Web Science aims to draw together theories, methods and findings from across academic disciplines, and to collaborate with industry, business, government and civil society, to develop our knowledge and understanding of the Web: the largest socio-technical infrastructure in human history.

The lecture provides an introduction to basic concepts of Web Science. Essential theoretical foundations, phenomena and approaches are presented and explained.

**Learning Content**

This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

**Workload**

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours

**Literature**

Exercises to Web Science
2511313, WS 18/19, 1 SWS, [Open in study portal]

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

Learning Content
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Workload
The total workload for the lecture Web Science is given out on the description of the lecture.

Literature
**Course: Welding Technology [T-MACH-105170]**

**Responsible:** Dr. Majid Farajian  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Spezielle Werkstoffkunde

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**Events**  
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<tr>
<td>WS 18/19</td>
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<td>Welding Technology</td>
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**Competence Certificate**  
Oral exam, about 20 minutes

**Prerequisites**  
none

**Recommendation**  
Basics of material science (iron- and non-iron alloys), materials, processes and production, design.  
All the relevant books of the German Welding Institute (DVS: Deutscher Verband für Schweißen und verwandte Verfahren) in the field of welding and joining is recommended.

*Below you will find excerpts from events regarding this course:*

**Welding Technology**  
2173571, WS 18/19, 2 SWS, Open in study portal

**Learning Content**  
definition, application and differentiation: welding, welding processes, alternative connecting technologies.  
history of welding technology  
sources of energy for welding processes  
Survey: Fusion welding, pressure welding.  
weld seam preparation/design  
welding positions  
weldability  
gas welding, thermal cutting, manual metal-arc welding  
submerged arc welding  
gas-shielded metal-arc welding, friction stir welding, laser beam and electron beam welding, other fusion and pressure welding processes  
static and cyclic behavior of welded joints, fatigue life improvement techniques

**Workload**  
The workload for the lecture Welding Technology is 120 h per semester and consists of the presence during the lecture (18 h) as well as preparation and rework time at home (102 h).
Literature
Für ergänzende, vertiefende Studien gibt das
Handbuch der Schweißtechnik von J. Ruge, Springer Verlag Berlin, mit seinen vier Bänden
Band I: Werkstoffe
Band II: Verfahren und Fertigung
Band III: Konstruktive Gestaltung der Bauteile
Band IV: Berechnung der Verbindungen

einen umfassenden Überblick. Der Stoff der Vorlesung Schweißtechnik findet sich in den Bänden I und II. Einen kompakten Einblick in die Lichtbogenschweißverfahren bietet das Bändchen
Nies: Lichtbogenschweißtechnik, Bibliothek der Technik Band 57, Verlag moderne Industrie AG und Co., Landsberg / Lech
Im Übrigen sei auf die zahlreichen Fachbücher des DVS Verlages, Düsseldorf, zu allen Einzelgebieten der Fügetechnik verwiesen.
<table>
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7.436 Course: Wildcard Key Competences Seminar 3 [T-WIWI-104682]

Organisation: University
Part of: M-WIWI-101808 - Seminarmodul

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### 7.438 Course: Wildcard Key Competences Seminar 5 [T-WIWI-104684]

**Organisation:** University  
**Part of:** M-WIWI-101808 - Seminarmodul

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Industrial Engineering and Management M.Sc.  
Module Handbook as of 04.03.2019
7.439 Course: Wildcard Key Competences Seminar 6 [T-WIWI-104685]

Organisation: University
Part of: M-WIWI-101808 - Seminarmodul

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7.440 Course: Wildcard Key Competences Seminar 8 [T-WIWI-105956]

Organisation: University
Part of: M-WIWI-101808 - Seminarmodul

Type
Prüfungsleistung anderer Art

Credits 4
Version 1
Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

**Responsible:** Prof. Dr. Hagen Lindstädt

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103119 - Strategie und Management: Fortgeschrittene Themen

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

**Prerequisites**
None

**Recommendation**
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

*Below you will find excerpts from events regarding this course:*

**Workshop Business Wargaming - Analyzing Strategic Interactions**
2577912, SS 2019, 2 SWS, Open in study portal

**Notes**
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

**Learning Content**
In this course, students simulate and analyze real-life conflict situations using Business Wargaming methods. The students will be able to understand the underlying structure and dynamics of various conflicts, this includes making own conclusions as well as deriving strategic recommendations.

**Workload**
The total workload for this course is approximately 90 hours.
- Lecture: 15 hours
- Preparation of lecture: 75 hours
- Exam preparation: n/a
7.442 Course: Workshop Current Topics in Strategy and Management [T-WIWI-106188]

**Responsible:** Prof. Dr. Hagen Lindstädt

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103119 - Strategie und Management: Fortgeschrittene Themen

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**Events**

| WS 18/19 | 2577921 | Workshop Current Topics in Strategy and Management | 2 SWS | Seminar (S) | Lindstädt, Burkardt, Müller |

**Competence Certificate**

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

**Prerequisites**

None

**Recommendation**

Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**

This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events regarding this course:

**Learning Content**

In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

**Annotation**

This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

**Workload**

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a
7.443 Course: X-ray Optics [T-MACH-109122]

Responsible: Dr. Arndt Last
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101291 - Mikrofertigung  
M-MACH-101292 - Mikrooptik

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Events

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Competence Certificate
oral exam (about 20 min)

Prerequisites
none

Below you will find excerpts from events regarding this course:

V X-ray Optics
2141007, WS 18/19, 2 SWS, Open in study portal

Learning Content
The lecture covers general principles of optics as well as basics, functioning and application of reflective, refractive and diffractive X-ray optical elements and systems. Selected X-ray analytical imaging methods and the necessary optical elements are discussed including their potentials and limitations.

Annotation
Lecture dates will be fixed in agreement with the students, see institutes website.
A visit at synchrotron ANKA is possible if requested.

Workload
lecture times plus assignment to review

Literature
M. Born und E. Wolf  
Principles of Optics, 7th (expanded) edition  
Cambridge University Press, 2010

A. Erko, M. Idir, T. Krist und A. G. Michette  
Modern Developments in X-Ray and Neutron Optics  
Springer Series in Optical Sciences, Vol. 137  
Springer-Verlag Berlin Heidelberg, 2008

D. Attwood  
Soft X-Rays and Extreme Ultraviolet Radiation: Principles and Applications  
Cambridge University Press, 1999