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1 General information

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! In the following we would like to give you a short introduction to the most important terms and rules that are important in connection with the choice of modules, courses and examinations.

1.1 Structural elements

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

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

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

1.2 Begin and completion of a module

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

1.3 Module versions

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

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

1.4 General and partial examinations

Module examinations can be either taken in a general examination or in partial examinations. If the module examination is offered as a general examination, the entire learning content of the module will be examined in a single 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.

1.5 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.
1.6 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](http://www.wiwi.kit.edu/hinweiseZweitwdh.php).

1.7 Examiners

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

1.8 Additional accomplishments

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

1.9 Further information

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](http://www.sle.kit.edu/amtlicheBekanntmachungen.php).

1.10 Contact

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

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Email: modul@wiwi.kit.edu\
2 Study plan

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

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

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
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<th>Economics</th>
<th>Informatics</th>
<th>Operations Research</th>
<th>Engineering</th>
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Figure 2: Structure of the Master Programme SPO2015 (Recommendation)

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

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

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

They have generalized or specialized expertise in the different disciplines.

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

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

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

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

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

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

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

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

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

**Soft skills**

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

**Enabling skills**

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

**Orientational knowledge**

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

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

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

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

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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.

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

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<td>Econometrics and Statistics I</td>
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**Election block: Informatics (at most 18 credits)**

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**Election block: Operations Research (at most 18 credits)**

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**Election block: Engineering Sciences (at most 18 credits)**

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<td>Generation and Transmission of Renewable Power</td>
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### Compulsory Elective Modules

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6 Modules

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

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

### Election block: Specialization module logistics ()

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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

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

**Prerequisites**

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

**Workload**

270 hours

**Learning type**

Lecture, tutorial.
M 6.2 Module: Advanced Topics in Public Finance [M-WIWI-101511]

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

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**Mandatory**

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**Election block: Supplementary Courses (between 4,5 and 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 student

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

**Prerequisites**

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

**Content**

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

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

**Recommendation**

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

**Annotation**

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

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.3 Module: Advanced Topics in Strategy and Management [M-WIWI-103119]

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

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Election block: Compulsory Elective Courses (9 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 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.
6.4 Module: Agglomeration and Innovation [M-WIWI-101497]

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

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<td>Innovation Theory and Policy</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 (Statistics)

### Credits
- 9

### Recurrence
- Each term

### Language
- German

### Level
- 4

### Version
- 2

#### Mandatory

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<tr>
<td>T-WIWI-103123</td>
<td>Advanced Statistics</td>
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**Election block: Supplementary Courses (between 4,5 and 5 credits)**

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<tr>
<td>T-WIWI-106341</td>
<td>Machine Learning 2 – Advanced Methods</td>
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<td>Zöllner</td>
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<tr>
<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</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.
6.6 Module: Applied Strategic Decisions [M-WIWI-101453]

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

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

**Part of:** Economics

**Compulsory Elective Modules (Economics)**

<table>
<thead>
<tr>
<th>Credits</th>
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<tr>
<td>T-WIWI-102861</td>
<td>Advanced Game Theory</td>
<td>4,5</td>
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**Election block: Supplementary Courses (between 4,5 and 5 credits)**

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<th>Course Code</th>
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<tr>
<td>T-WIWI-102613</td>
<td>Auction Theory</td>
<td>4,5</td>
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<td>Ehrhart</td>
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<td>T-WIWI-102614</td>
<td>Experimental Economics</td>
<td>4,5</td>
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<td>T-WIWI-102622</td>
<td>Corporate Financial Policy</td>
<td>4,5</td>
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<td>T-WIWI-102623</td>
<td>Financial Intermediation</td>
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<td>Ruckes</td>
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<td>T-WIWI-102640</td>
<td>Market Engineering: Information in Institutions</td>
<td>4,5</td>
<td>4,5</td>
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<tr>
<td>T-WIWI-102862</td>
<td>Predictive Mechanism and Market Design</td>
<td>4,5</td>
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<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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**Competence Certificate**

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

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

**Competence Goal**

Students

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

**Prerequisites**

The course "Advanced Game Theory" is obligatory. Exception: The course "Introduction to Game Theory" was completed. Even those who have already successfully proven "Advanced Game Theory" in another master module can take the module. In this case you can choose freely from the rest of the offer. Registration for the last examination in the module is done by the Faculty Examination Office.

**Content**

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

**Recommendation**

Basic knowledge in game theory is assumed.

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. The exact distribution is made according to the credit points of the courses of the module.
Module: Automated Manufacturing Systems [M-MACH-101298]

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

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

<table>
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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
6.8 Module: Automotive Engineering [M-MACH-101266]

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

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

<table>
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<tr>
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**Election block: Automotive Engineering (at least 9 credits)**

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<tr>
<td>T-MACH-100092</td>
<td>Automotive Engineering I</td>
<td>6 CR</td>
<td>Each term</td>
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<td>T-MACH-102117</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering</td>
<td>4.5 CR</td>
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<td>T-MACH-102116</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies I</td>
<td>1.5 CR</td>
<td>Each term</td>
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<td>T-MACH-102119</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies II</td>
<td>1.5 CR</td>
<td>Each term</td>
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<td>T-MACH-102093</td>
<td>Fluid Power Systems</td>
<td>5 CR</td>
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<td>T-MACH-102150</td>
<td>BUS-Controls</td>
<td>3 CR</td>
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<td>T-MACH-108889</td>
<td>BUS-Controls - Advance</td>
<td>3 CR</td>
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<td>T-MACH-102203</td>
<td>Automotive Engineering I</td>
<td>6 CR</td>
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<td>T-MACH-110796</td>
<td>Python Algorithm for Vehicle Technology</td>
<td>4 CR</td>
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**Competence Certificate**
The assessment is carried out as partial exams.
The partial exams consist of a written exam (90 to 120 minutes) or an oral exam (duration 30 to 40 minutes).

**Competence Goal**
The student

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

**Prerequisites**
None

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

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

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

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

**Learning type**
The teaching and learning procedures (lecture, lab course, workshop) are described for each course of the module separately.
6.9 Module: BioMEMS [M-MACH-101290]

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

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

### Mandatory

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<th>Version</th>
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<th>Module Code</th>
<th>Title</th>
<th>Credits</th>
<th>Lecturer(s)</th>
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<tbody>
<tr>
<td>T-MACH-100966</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I</td>
<td>3 CR</td>
<td>Guber</td>
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<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology</td>
<td>3 CR</td>
<td>Last</td>
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<tr>
<td>T-MACH-102165</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers</td>
<td>3 CR</td>
<td>Heckele, 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>
<td>Guber</td>
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<tr>
<td>T-MACH-100968</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III</td>
<td>3 CR</td>
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<td>T-MACH-101910</td>
<td>Microactuators</td>
<td>3 CR</td>
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<td>T-MACH-102172</td>
<td>Bionics for Engineers and Natural Scientists</td>
<td>3 CR</td>
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<td>T-MACH-102176</td>
<td>Current Topics on BioMEMS</td>
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### Election block: BioMEMS (at least 6 credits)

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<th>Lecturer(s)</th>
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<tr>
<td>T-MACH-100966</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I</td>
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<td>Guber</td>
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<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology</td>
<td>3 CR</td>
<td>Last</td>
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<tr>
<td>T-MACH-102165</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers</td>
<td>3 CR</td>
<td>Heckele, Mappes</td>
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<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II</td>
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<td>Bionics for Engineers and Natural Scientists</td>
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<td>Current Topics on BioMEMS</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 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.
Module: BioMEMS [M-MACH-101290]

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

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

<table>
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<th>Credits</th>
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Election block: Compulsory Elective Courses (9 credits)

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<th>Course Title</th>
<th>Credits</th>
<th>Lecturer</th>
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<tr>
<td>T-WIWI-102639</td>
<td>Business Models in the Internet: Planning and Implementation</td>
<td>4.5 CR</td>
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<tr>
<td>T-WIWI-102848</td>
<td>Personalization and Services</td>
<td>4.5 CR</td>
<td>Sonnenbichler</td>
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<td>T-WIWI-110887</td>
<td>Practical Seminar: Service Innovation</td>
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<td>Satzger</td>
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<td>T-WIWI-102847</td>
<td>Recommender Systems</td>
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<td>T-WIWI-102641</td>
<td>Service Innovation</td>
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<td>Satzger</td>
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<td>T-WIWI-109940</td>
<td>Special Topics in Information Systems</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) 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.
6.11 Module: Collective Decision Making [M-WIWI-101504]

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

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**Election block: Compulsory Elective Courses ()**

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<tbody>
<tr>
<td>T-WIWI-102740</td>
<td>Public Management</td>
<td>4.5</td>
<td>Wigger</td>
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<tr>
<td>T-WIWI-102859</td>
<td>Social Choice Theory</td>
<td>4.5</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**

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.
6.12 Module: Combustion Engines I [M-MACH-101275]

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

**Organisation:** KIT Department of Mechanical Engineering

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

<table>
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**Election block: Wahlpflicht (between 1 and 2 items)**

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<th>Responsible</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
### 6.13 Module: Combustion Engines II [M-MACH-101303]

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

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

<table>
<thead>
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#### Mandatory

<table>
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<tr>
<td>T-MACH-104609</td>
<td>Combustion Engines II</td>
<td>5 CR</td>
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**Election block: Verbrennungsmotoren II (at least 4 credits)**

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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-105169</td>
<td>Engine Measurement Techniques</td>
<td>4 CR</td>
<td>Bernhardt</td>
</tr>
<tr>
<td>T-MACH-110817</td>
<td>Development of hybrid drivetrains</td>
<td>4 CR</td>
<td>Koch</td>
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<tr>
<td>T-MACH-110816</td>
<td>Großdiesel- und -gasmotoren für Schiffsantriebe</td>
<td>4 CR</td>
<td>Kubach</td>
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<tr>
<td>T-MACH-105649</td>
<td>Boosting of Combustion Engines</td>
<td>4 CR</td>
<td>Kech, Kubach</td>
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<tr>
<td>T-MACH-105985</td>
<td>Ignition Systems</td>
<td>4 CR</td>
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</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

#### 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

#### Workload

- Regular attendance: 62 h
- Self-study: 208 h

#### Learning type

Lecture, Tutorial
Module: Commercial Law [M-INFO-101191]

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

**Organisation:** KIT Department of Informatics

**Part of:** Compulsory Elective Modules (Law or Sociology)

<table>
<thead>
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<th>Level</th>
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**Mandatory**

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<th>Course Title</th>
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<tr>
<td>T-INFO-102013</td>
<td>Exercises in Civil Law</td>
<td>9 CR</td>
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</table>

Dreier, Matz
Module: Control Engineering II [M-ETIT-101157]

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

 Organisation: KIT Department of Electrical Engineering and Information Technology

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

<table>
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<th>Version</th>
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<tr>
<td>9</td>
<td>Each term</td>
<td>4</td>
<td>2</td>
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**Competence Certificate**

The assessment is carried out as partial written exams of the single courses of this module (T-ETIT-100981 and T-ETIT-100666). The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**

The students

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

**Prerequisites**

none

**Content**

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

**Recommendation**

For this module a basic knowledge in system theory and control engineering is assumed. These subjects can be found in the course System Dynamics and Control Engineering (2303155) which is recommended to have been attended beforehand.

**Workload**

See German version.
6.16 Module: Cross-Functional Management Accounting [M-WIWI-101510]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: Business Administration

<table>
<thead>
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<td>T-WIWI-102885</td>
<td>Advanced Management Accounting</td>
<td>4.5</td>
<td>Wouters</td>
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Election block: Supplementary Courses (4,5 credits)

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<tr>
<td>T-WIWI-110179</td>
<td>Advanced Management Accounting 2</td>
<td>4.5</td>
<td>Wouters</td>
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<tr>
<td>T-WIWI-105777</td>
<td>Business Intelligence Systems</td>
<td>4.5</td>
<td>Mädche, Nadj, Toreini</td>
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<tr>
<td>T-WIWI-105781</td>
<td>Incentives in Organizations</td>
<td>4.5</td>
<td>Nieken</td>
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<tr>
<td>T-WIWI-102835</td>
<td>Marketing Strategy Business Game</td>
<td>1.5</td>
<td>Klarmann</td>
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<td>T-WIWI-107720</td>
<td>Market Research</td>
<td>4.5</td>
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<td>T-WIWI-102883</td>
<td>Pricing</td>
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<td>T-WIWI-109864</td>
<td>Product and Innovation Management</td>
<td>3</td>
<td>Klarmann</td>
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<td>T-WIWI-102621</td>
<td>Valuation</td>
<td>4.5</td>
<td>Ruckes</td>
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<td>T-WIWI-108651</td>
<td>Extraordinary additional course in</td>
<td>4.5</td>
<td>Wouters</td>
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<td></td>
<td>module Cross-Functional Management Accounting</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 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 for Finance [M-WIWI-105032]

**Responsible:** Prof. Dr. Maxim Ulrich

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

**Part of:** Business Administration

**Compulsory Elective Modules (Business Administration)**

<table>
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Mandatory

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<tr>
<td>T-WIWI-102878</td>
<td>Computational Risk and Asset Management</td>
<td>4,5</td>
<td>Ulrich</td>
</tr>
<tr>
<td>T-WIWI-110213</td>
<td>Python for Computational Risk and Asset Management</td>
<td>4,5</td>
<td>Ulrich</td>
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</table>

**Competence Certificate**

The module examination takes the form of an alternative exam assessment. The alternative exam assessment consists of a Python-based "Takehome Exam". At the end of the third week of January, the student is given a "Takehome Exam" which he processes and sends back independently within 12 hours using Python. Precise instructions will be announced at the beginning of the course. The alternative exam assessment can be repeated a maximum of once. A timely repeat option takes place at the end of the third week in March of the same year. More detailed instructions will be given at the beginning of the course.

**Competence Goal**

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

**Content**

The course covers several topics, among them:

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

**Recommendation**

Basic knowledge of capital market theory.

**Workload**

The total workload for this module is 270 hours (9 credit points). The total number of hours resulting from income from studying online video, answering quizzes, studying Ipython notebooks, active and interactive "Python Data Sessions" and reading literature you have heard.
6.18 Module: Data Science: Advanced CRM [M-WIWI-101470]

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

<table>
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<th>Election block: Compulsory Elective Courses (9 credits)</th>
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<tr>
<td>T-WIWI-109921  Advanced Machine Learning  4.5 CR Geyer-Schulz, Nazemi</td>
</tr>
<tr>
<td>T-WIWI-102762  Business Dynamics  4.5 CR Geyer-Schulz</td>
</tr>
<tr>
<td>T-WIWI-110915  Intelligent Agents and Decision Theory  4.5 CR Geyer-Schulz</td>
</tr>
<tr>
<td>T-WIWI-103549  Intelligent CRM Architectures  4.5 CR Geyer-Schulz</td>
</tr>
<tr>
<td>T-WIWI-102848  Personalization and Services  4.5 CR Sonnenbichler</td>
</tr>
<tr>
<td>T-WIWI-102847  Recommender Systems  4.5 CR Geyer-Schulz</td>
</tr>
<tr>
<td>T-WIWI-105778  Service Analytics A  4.5 CR Fromm</td>
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</tbody>
</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

- 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 addressed 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.
### 6.19 Module: Data Science: Data-Driven Information Systems [M-WIWI-103117]

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

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

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

<table>
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<th>Level</th>
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**Election block: Compulsory Elective Courses ()**

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<tr>
<td>T-WIWI-108715</td>
<td>Artificial Intelligence in Service Systems</td>
<td>4.5 CR</td>
<td>Satzger</td>
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<tr>
<td>T-WIWI-109863</td>
<td>Business Data Analytics: Application and Tools</td>
<td>4.5 CR</td>
<td>Weinhardt</td>
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<tr>
<td>T-WIWI-106187</td>
<td>Business Data Strategy</td>
<td>4.5 CR</td>
<td>Weinhardt</td>
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<tr>
<td>T-WIWI-105777</td>
<td>Business Intelligence Systems</td>
<td>4.5 CR</td>
<td>Mädche, Nadj, Toreini</td>
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<tr>
<td>T-WIWI-110918</td>
<td>Introduction to Bayesian Statistics for Analyzing Data</td>
<td>3 CR</td>
<td>Scheibehenne</td>
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<td>T-WIWI-106207</td>
<td>Practical Seminar: Data-Driven Information Systems</td>
<td>4.5 CR</td>
<td>Mädche, Satzger, Setzer, 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.

**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 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.
6.20 Module: Data Science: Data-Driven User Modeling [M-WIWI-103118]

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

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<th>Language</th>
<th>Level</th>
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Election block: Compulsory Elective Courses (at least 9 credits)

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<tr>
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<tr>
<td>T-WIWI-109863</td>
<td>Business Data Analytics: Application and Tools</td>
<td>4.5</td>
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<tr>
<td>T-WIWI-102614</td>
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<td>T-WIWI-111109</td>
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<tr>
<td>T-WIWI-102899</td>
<td>Modeling and Analyzing Consumer Behavior with R</td>
<td>4.5</td>
<td>CR Dorner, Weinhardt</td>
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<tr>
<td>T-WIWI-108765</td>
<td>Practical Seminar: Advanced Analytics</td>
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</table>

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

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

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**Election block: Compulsory Elective Courses (9 credits)**

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<tr>
<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 first 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. Please note that a successful completion of "Market Research" is a prerequisite for the completion of "Marketing Analytics".

**Recommendation**  
None

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

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

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

**Part of:**  Engineering Sciences

**Compulsory Elective Modules (Engineering Sciences)**

<table>
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**Mandatory**

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<tr>
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<td>Design Basics in Highway Engineering</td>
<td>3 CR</td>
<td>Roos</td>
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<td>T-BGU-106300</td>
<td>Infrastructure Management</td>
<td>6 CR</td>
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**Competence Goal**

See German version.

**Prerequisites**

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

**Recommendation**

None

**Annotation**

None

**Workload**

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

### Responsible:
Prof. Dr. Alexander Mädche

### Organisation:
KIT Department of Economics and Management

### Part of:
Business Administration

#### Compulsory Elective Modules (Business Administration)

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### Election block: Supplementary Courses (at most 4.5 credits)

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<td>Engineering Interactive Systems</td>
<td>4,5 CR</td>
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<td>T-WIWI-111109</td>
<td>KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics</td>
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<td>T-WIWI-108437</td>
<td>Practical Seminar: Information Systems and Service Design</td>
<td>4,5 CR</td>
<td>Mädche</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.

### Competence Goal

The student

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

### Prerequisites

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

### Content

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

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

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

### Annotation


### Workload

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

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

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

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

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**Election block: Compulsory Elective Courses (9 credits)**

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<td>4,5 CR</td>
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<td>T-WIWI-110280</td>
<td>Digital Services: Business Models and Transformation</td>
<td>4,5 CR</td>
<td>Satzger</td>
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<tr>
<td>T-WIWI-107043</td>
<td>Liberalised Power Markets</td>
<td>3 CR</td>
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<td>Modeling and OR-Software: Advanced Topics</td>
<td>4,5 CR</td>
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<td>T-WIWI-106563</td>
<td>Practical Seminar Digital Service Systems</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
- 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.
Module: Econometrics and Statistics I [M-WIWI-101638]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management

Part of:
- Economics
- Compulsory Elective Modules (Economics)
- Compulsory Elective Modules (Statistics)

Credits: 9
Recurrence: Each term
Language: German
Level: 4
Version: 4

Mandatory

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<td>Applied Econometrics</td>
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Election block: Supplementary Courses (between 4.5 and 5 credits)

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<tr>
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<td>Data Mining and Applications</td>
<td>4.5</td>
<td>Nakhaeizadeh</td>
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<tr>
<td>T-WIWI-103064</td>
<td>Financial Econometrics</td>
<td>4.5</td>
<td>Schienle</td>
</tr>
<tr>
<td>T-WIWI-103126</td>
<td>Non- and Semiparametrics</td>
<td>4.5</td>
<td>Schienle</td>
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<tr>
<td>T-WIWI-103127</td>
<td>Panel Data</td>
<td>4.5</td>
<td>Heller</td>
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<tr>
<td>T-WIWI-110868</td>
<td>Predictive Modeling</td>
<td>4.5</td>
<td>Krüger</td>
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<td>T-WIWI-103065</td>
<td>Statistical Modeling of Generalized Regression Models</td>
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<td>Financial Econometrics II</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.
6.26 Module: Econometrics and Statistics II [M-WIWI-101639]

**Responsible:** Prof. Dr. Melanie Schienle

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

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

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**Election block: Compulsory Elective Courses (between 9 and 10 credits)**

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<td>Data Mining and Applications</td>
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<td>Portfolio and Asset Liability Management</td>
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<td>Financial Econometrics II</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.

**Content**

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

**Workload**

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

**Responsibility:** Prof. Dr. Kay Mitusch

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

**Part of:** Economics

<table>
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**Election block: Compulsory Elective Courses (1 item)**

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<td>Advanced Topics in Economic Theory</td>
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<tr>
<td>T-WIWI-102861</td>
<td>Advanced Game Theory</td>
<td>4,5 CR</td>
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**Election block: Supplementary Courses (1 item)**

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<tr>
<td>T-WIWI-102647</td>
<td>Asset Pricing</td>
<td>4,5 CR</td>
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<td>T-WIWI-102622</td>
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<td>Financial Intermediation</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 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 “Financial Intermediation” 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

**Compulsory Elective Modules (Business Administration)**

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**Election block: Compulsory Elective Courses (at least 9 credits)**

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<th>Instructor</th>
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<td>Energy Networks and Regulation</td>
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<td>Smart Grid Applications</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.
6.29 Module: Electives in Informatics [M-WIWI-101630]

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

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

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

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**Elective block:** Compulsory Elective Area (I)

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**Elective block:** Seminars and Advanced Labs (I)

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
### 6.30 Module: Electronic Markets [M-WIWI-101409]

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

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**Election block: Compulsory Elective Courses (at least 9 credits)**

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<td>Geyer-Schulz</td>
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**Competence Certificate**

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

The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module 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.
# Module: Emphasis in Informatics [M-WIWI-101628]

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

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

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

### Credits: 9

### Recurrence: Each term

### Duration: 1 semester

### Level: 4

### Version: 12

## Election block: Compulsory Elective Area (between 1 and 3 items)

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<td>Critical Information Infrastructures</td>
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<td>Knowledge Discovery</td>
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## Election block: Seminars and Advanced Labs ()

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
6.32 Module: Energy and Process Technology I [M-MACH-101296]

**Responsible:** Dr.-Ing. Heinrich Wirbser

**Organisation:** KIT Department of Mechanical Engineering

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

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**Mandatory**

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**Compentence 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 hold in German only.
6.33 Module: Energy and Process Technology II [M-MACH-101297]

**Responsible:** Dr.-Ing. Heinrich Wirbser

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Engineering Sciences)**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
<th>Version</th>
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<tr>
<td>9</td>
<td>Each summer term</td>
<td>1 semester</td>
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**Mandatory**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>T-MACH-102212</td>
<td>Energy and Process Technology II</td>
<td>9 CR</td>
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**Compentence 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 (Business Administration)

<table>
<thead>
<tr>
<th>Credits</th>
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<td>German/English</td>
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Mandatory

| T-WIWI-107043 | Liberalised Power Markets | 3 CR | Fichtner |

Election block: Supplementary Courses (at least 6 credits)

| T-WIWI-102691 | Energy Trade and Risk Management | 3 CR | N.N. |
| T-WIWI-107501 | Energy Market Engineering | 4,5 CR | Weinhardt |
| T-WIWI-108016 | Simulation Game in Energy Economics | 3 CR | Genoese |
| T-WIWI-107446 | Quantitative Methods in Energy Economics | 3 CR | Plötz |
| T-WIWI-102712 | Regulation Theory and Practice | 4,5 CR | Mitusch |

Competence Certificate

The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module 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 the new requirements of liberalised energy markets,
- describes the planning tasks on the different energy markets,
- knows solution approaches to respective planning tasks.

Prerequisites

The lecture Liberalised Power Markets has to be examined.

Content

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

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

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

Recommendation

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

Workload

The total workload for this module is approximately 270 hours.
6.35 Module: Energy Economics and Technology [M-WIWI-101452]

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

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<th>Level</th>
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Election block: Compulsory Elective Courses (at least 9 credits)

<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-102793</td>
<td>Efficient Energy Systems and Electric Mobility</td>
<td>3,5 CR</td>
<td>Jochem</td>
</tr>
<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, Fichtner</td>
</tr>
<tr>
<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>
<td>3 CR</td>
<td>Fichtner</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.
6.36 Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

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

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

**Part of:** Business Administration

**Compulsory Elective Modules (Business Administration)**

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

**Election block: Mandatory part (1 item)**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
<th>Professor</th>
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<tbody>
<tr>
<td>T-WIWI-102864</td>
<td>Entrepreneurship</td>
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**Election block: Compulsory Elective Courses (1 item)**

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<tr>
<td>T-WIWI-102865</td>
<td>Business Planning</td>
<td>3 CR</td>
<td>Terzidis</td>
</tr>
<tr>
<td>T-WIWI-110389</td>
<td>Business Planning for Founders - EUCOR</td>
<td>3 CR</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-102866</td>
<td>Design Thinking</td>
<td>3 CR</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-102833</td>
<td>Entrepreneurial Leadership &amp; Innovation Management</td>
<td>3 CR</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-102894</td>
<td>Entrepreneurship Research</td>
<td>3 CR</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-110381</td>
<td>International Selling - EUCOR</td>
<td>3 CR</td>
<td>Casenave, Klarmann</td>
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<tr>
<td>T-WIWI-110985</td>
<td>International Business Development and Sales</td>
<td>6 CR</td>
<td>Casenave, Klarmann, Terzidis</td>
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**Election block: Supplementary Courses (1 item)**

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<td>T-WIWI-102866</td>
<td>Design Thinking</td>
<td>3 CR</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-102851</td>
<td>Developing Business Models for the Semantic Web</td>
<td>3 CR</td>
<td>Sure-Vetter</td>
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<tr>
<td>T-WIWI-102833</td>
<td>Entrepreneurial Leadership &amp; Innovation Management</td>
<td>3 CR</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-102894</td>
<td>Entrepreneurship Research</td>
<td>3 CR</td>
<td>Terzidis</td>
</tr>
<tr>
<td>T-WIWI-102852</td>
<td>Case Studies Seminar; Innovation Management</td>
<td>3 CR</td>
<td>Weissenberger-Eibl</td>
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<tr>
<td>T-WIWI-102639</td>
<td>Business Models in the Internet: Planning and Implementation</td>
<td>4,5 CR</td>
<td>Weinhardt</td>
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<tr>
<td>T-WIWI-102865</td>
<td>Business Planning</td>
<td>3 CR</td>
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<td>T-WIWI-110389</td>
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<td>T-WIWI-110374</td>
<td>Firm creation in IT security</td>
<td>3 CR</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-102893</td>
<td>Innovation Management: Concepts, Strategies and Methods</td>
<td>3 CR</td>
<td>Weissenberger-Eibl</td>
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<td>International Selling - EUCOR</td>
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<td>Casenave, Klarmann</td>
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<tr>
<td>T-WIWI-109064</td>
<td>Joint Entrepreneurship Summer School</td>
<td>6 CR</td>
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<tr>
<td>T-WIWI-102612</td>
<td>Managing New Technologies</td>
<td>3 CR</td>
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<td>T-WIWI-102853</td>
<td>Roadmapping</td>
<td>3 CR</td>
<td>Koch</td>
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<tr>
<td>T-WIWI-110985</td>
<td>International Business Development and Sales</td>
<td>6 CR</td>
<td>Casenave, Klarmann, Terzidis</td>
</tr>
</tbody>
</table>

**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.
6.37 Module: Environmental Economics [M-WIWI-101468]

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

<table>
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<th>Level</th>
<th>Version</th>
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Election block: Compulsory Elective Courses (at least 9 credits)

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<th>Credits</th>
<th>Lecturer</th>
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<tr>
<td>T-WIWI-102650</td>
<td>Energy and Environment</td>
<td>4.5 CR</td>
<td>Karl</td>
</tr>
<tr>
<td>T-WIWI-10007</td>
<td>Transport Economics</td>
<td>4.5 CR</td>
<td>Mitusch, Szimba</td>
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<tr>
<td>T-WIWI-102615</td>
<td>Environmental Economics and Sustainability</td>
<td>5 CR</td>
<td>Walz</td>
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<tr>
<td>T-WIWI-102616</td>
<td>Environmental and Resource Policy</td>
<td>4 CR</td>
<td>Walz</td>
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<tr>
<td>T-INFO-101348</td>
<td>Environmental Law</td>
<td>3 CR</td>
<td>Eichenhofer</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 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 (Economics)

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**Election block: Compulsory Elective Courses (2 items)**

<table>
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<th>Lecturer</th>
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<td>T-WIWI-102614</td>
<td>Experimental Economics</td>
<td>4.5 CR</td>
<td>Weinhardt</td>
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<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-102862</td>
<td>Predictive Mechanism and Market Design</td>
<td>4.5 CR</td>
<td>Reiß</td>
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<td>T-WIWI-102863</td>
<td>Topics in Experimental Economics</td>
<td>4.5 CR</td>
<td>Reiß</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.
6.39 Module: Extracurricular Module in Engineering [M-WIWI-101404]

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

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

**Part of:** Engineering Sciences

<table>
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<tbody>
<tr>
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**Election block: Compulsory Elective Courses (between 9 and 12 credits)**

<table>
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<tr>
<td>T-WIWI-108384</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**

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

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

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

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

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

**Workload**

The total workload for this module is about 270 hours (9 credits). The distribution is based on the credit points of the courses completed as part of the module.
Module: Finance 1 [M-WIWI-101482]

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

Organisation: KIT Department of Economics and Management

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

<table>
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<th>Language</th>
<th>Level</th>
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<td>1 semester</td>
<td>German/English</td>
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Election block: Compulsory Elective Courses (9 credits)

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<th>Course Title</th>
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<tbody>
<tr>
<td>T-WIWI-102643</td>
<td>Derivatives</td>
<td>4.5</td>
<td>Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-102621</td>
<td>Valuation</td>
<td>4.5</td>
<td>Ruckes</td>
</tr>
<tr>
<td>T-WIWI-102647</td>
<td>Asset Pricing</td>
<td>4.5</td>
<td>Ruckes, Uhrig-Homburg</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

- 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.
### 6.41 Module: Finance 2 [M-WIWI-101483]

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

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

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

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**Credits:** 9  
**Recurrence:** Each term  
**Duration:** 1 semester  
**Language:** German/English  
**Level:** 4  
**Version:** 7

#### Election block: Compulsory Elective Courses (9 credits)

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<td>4,5</td>
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<td>CR</td>
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<td>T-WIWI-110997</td>
<td>Bond Markets - Models &amp; Derivatives</td>
<td>3</td>
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<td>Bond Markets - Tools &amp; Applications</td>
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<td>T-WIWI-109050</td>
<td>Corporate Risk Management</td>
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<td>eFinance: Information Systems for Securities Trading</td>
<td>4,5</td>
<td>CR</td>
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**Competition 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.

**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.
Module: Finance 3 [M-WIWI-101480]

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

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

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

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**Election block: Compulsory Elective Courses (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**
The student is in a position to discuss, analyze and provide answers to advanced economic and methodological issues in the field of modern finance.

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

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
6.43 Module: FinTech Innovations [M-WIWI-105036]

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

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**Mandatory**

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

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

**Competence Goal**
Students will learn to connect innovative financial research with modern information technology to build a prototype that solves some daunting tasks for professional end-users in the field of modern asset and risk management. Students with correspondingly good technological knowledge and a corresponding affinity for IT applications independently create their own prototypes in order to solve an extensive FinTech problem. Students learn to organize themselves in a team in a goal-oriented manner and to bring a comprehensive software project from the field of financial technology to success in partial steps. In addition, students deepen their financial and IT skills and are therefore able to successfully complete this interface, which is important for the booming FinTech market. Students of this module are particularly well prepared for management tasks in various innovation projects (not only in the area of FinTech).

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

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

**Recommendation**
None

**Workload**
Total effort for 9 credit points: approx. 270 hours.
**Module: Fundamentals of Transportation [M-BGU-101064]**

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

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

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Engineering Sciences)**

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

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

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<td>Information Management for Public Mobility Services</td>
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**Competence Goal**

See German version.

**Prerequisites**

None

**Recommendation**

None
6.45 Module: Generation and Transmission of Renewable Power [M-ETIT-101164]

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

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

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

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**Election block: compulsory optional subject (at least 9 credits)**

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<td>T-ETIT-101941</td>
<td>Power Transmission and Power Network Control</td>
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<td>T-ETIT-101915</td>
<td>High-Voltage Test Technique</td>
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**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

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<td>Tutorial Global Production</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

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

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

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#### Election block: Governance, Risk & Compliance (at least 1 item as well as at least 6 credits)

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<td>Data Protection by Design</td>
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<td>T-INFO-109910</td>
<td>IT- Security Law</td>
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Module: Growth and Agglomeration [M-WIWI-101496]

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

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

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

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**Election block: Compulsory Elective Courses (9 credits)**

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<td>Spatial Economics</td>
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**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 (Engineering Sciences)**

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<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>9</td>
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<td>1 semester</td>
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**Election block: Vehicle Properties (at least 9 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecturer(s)</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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<tr>
<td>T-MACH-105153</td>
<td>Handling Characteristics of Motor Vehicles II</td>
<td>3 CR</td>
<td>Unrau</td>
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<tr>
<td>T-MACH-105154</td>
<td>Vehicle Comfort and Acoustics I</td>
<td>3 CR</td>
<td>Gauterin</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>
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<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I</td>
<td>3 CR</td>
<td>Ammon</td>
</tr>
<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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</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.

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

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

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

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

<table>
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<tr>
<td>T-ETIT-110266</td>
<td>High-Voltage Technology</td>
<td>6</td>
<td>Badent</td>
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<tr>
<td>T-ETIT-100723</td>
<td>Electronics and EMC</td>
<td>3</td>
<td>Sack</td>
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**Competence Goal**

The student

- has wide knowledge of electrical power engineering.
- is capable to analyse and develop electrical power engineering systems.
- know coupling mechanisms and possible coupling paths for interference signals in electronic circuits and systems, as well as measures for interference suppression and for the functionally reliable construction of such systems.
Module: Highway Engineering [M-BGU-100999]

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

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

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

<table>
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<td>T-BGU-101860</td>
<td>Special Topics in Highway Engineering and Environmental Impact Assessment</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” (WI4INGBGU1).

**Recommendation**
None

**Annotation**
None

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

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

<table>
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<td>Planning and Management of Industrial Plants</td>
<td>5,5 CR</td>
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#### Election block: Supplementary Courses (at most 1 item)

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<th>Credits</th>
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<tbody>
<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>Schultmann, Wiens</td>
</tr>
<tr>
<td>T-WIWI-102828</td>
<td>Supply Chain Management in the Automotive Industry</td>
<td>3,5 CR</td>
<td>Heupel, Lang</td>
</tr>
<tr>
<td>T-WIWI-103134</td>
<td>Project Management</td>
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#### Election block: Supplementary Courses (at most 1 item)

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<th>Course Title</th>
<th>Credits</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>T-WIWI-102634</td>
<td>Emissions into the Environment</td>
<td>3,5 CR</td>
<td>Karl</td>
</tr>
<tr>
<td>T-WIWI-102882</td>
<td>International Management in Engineering and Production</td>
<td>3,5 CR</td>
<td>Sasse</td>
</tr>
<tr>
<td>T-WIWI-110512</td>
<td>Life Cycle Assessment</td>
<td>3,5 CR</td>
<td>Schultmann</td>
</tr>
</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.
### 6.53 Module: Industrial Production III [M-WIWI-101412]

**Responsible:** Prof. Dr. Frank Schultmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Business Administration  
**Compulsory Elective Modules (Business Administration)**  
**Credits:** 9  
**Recurrence:** Each summer term  
**Duration:** 1 semester  
**Language:** German/English  
**Level:** 4  
**Version:** 2

#### Mandatory

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<td>T-WIWI-102632</td>
<td>Production and Logistics Management</td>
<td>5.5 CR</td>
<td>Glöser-Chahoud, Schultmann</td>
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**Election block: Supplementary Courses from Module Industrial Production II (at most 1 item)**

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<tr>
<td>T-WIWI-102634</td>
<td>Emissions into the Environment</td>
<td>3.5 CR</td>
<td>Karl</td>
</tr>
<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-110512</td>
<td>Life Cycle Assessment</td>
<td>3.5 CR</td>
<td>Schultmann</td>
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**Election block: Supplementary Courses (at most 1 item)**

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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>Schultmann, Wiens</td>
</tr>
<tr>
<td>T-WIWI-102828</td>
<td>Supply Chain Management in the Automotive Industry</td>
<td>3.5 CR</td>
<td>Heupel, Lang</td>
</tr>
<tr>
<td>T-WIWI-103134</td>
<td>Project Management</td>
<td>3.5 CR</td>
<td>Schultmann</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.
## 6.54 Module: Informatics [M-WIWI-101472]

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

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

**Part of:**
Informatics

### Election block: Compulsory Elective Area ()

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<td>4.5 CR</td>
<td>Each term</td>
<td>1 semester</td>
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<tr>
<td>T-WIWI-109248</td>
<td>Critical Information Infrastructures</td>
<td>4.5 CR</td>
<td>Each term</td>
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<tr>
<td>T-WIWI-109246</td>
<td>Digital Health</td>
<td>4.5 CR</td>
<td>Each term</td>
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<td>T-WIWI-109270</td>
<td>Human Factors in Security and Privacy</td>
<td>4.5 CR</td>
<td>Each term</td>
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<tr>
<td>T-WIWI-102661</td>
<td>Database Systems and XML</td>
<td>4.5 CR</td>
<td>Each term</td>
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<tr>
<td>T-WIWI-102668</td>
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<tr>
<td>T-WIWI-110346</td>
<td>Supplement Enterprise Information Systems</td>
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<td>Each term</td>
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<td>T-WIWI-110372</td>
<td>Supplement Software- and Systemsengineering</td>
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<td>T-WIWI-106423</td>
<td>Information Service Engineering</td>
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<td>T-WIWI-110863</td>
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<td>Knowledge Discovery</td>
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<td>Management of IT-Projects</td>
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**Election block: Seminars and Advanced Labs (between 0 and 1 items)**

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<td>T-WIWI-111125</td>
<td>Advanced Lab Sociotechnical Information Systems Development (Master)</td>
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<td>4.5 CR</td>
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<td>Selected Issues in Critical Information Infrastructures</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**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.55 Module: Information Engineering [M-WIWI-101411]

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
<th>Version</th>
</tr>
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<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
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Election block: Supplementary Courses (between 4 and 4,5 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>T-WIWI-107501</td>
<td>Energy Market Engineering</td>
<td>4,5 CR</td>
<td>Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-102640</td>
<td>Market Engineering: Information in Institutions</td>
<td>4,5 CR</td>
<td>Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-109940</td>
<td>Special Topics in Information Systems</td>
<td>4,5 CR</td>
<td>Weinhardt</td>
</tr>
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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
The student
- understands and analyzes the central role of information as an economic good, a production factor, and a competitive factor,
- identifies, evaluates, prices, and markets information goods,
- analyze and evaluate existing markets regarding the missing incentives and the optimal solution of a given market mechanism, respectively,
- develop solutions in teams.

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

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

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Information Systems in Organizations [M-WIWI-104068]

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

Election block: Compulsory Elective Courses (at least 9 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Recurrence</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-105777</td>
<td>Business Intelligence Systems</td>
<td>4.5 CR</td>
<td>Each term</td>
<td>German</td>
<td>4</td>
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<tr>
<td>T-WIWI-110851</td>
<td>Designing Interactive Systems</td>
<td>4.5 CR</td>
<td>Each term</td>
<td>Gnewuch</td>
<td>Mädche</td>
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</tr>
<tr>
<td>T-WIWI-108437</td>
<td>Practical Seminar: Information Systems and Service Design</td>
<td>4.5 CR</td>
<td>Each term</td>
<td>Mädche</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 [M-WIWI-101478]

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

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

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
<td>German/English</td>
<td>4</td>
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**Election block: Compulsory Elective Courses (between 9 and 10 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>T-WIWI-109194</td>
<td>Dynamic Macroeconomics</td>
<td>4.5 CR</td>
<td>Brumm</td>
</tr>
<tr>
<td>T-WIWI-102785</td>
<td>Theory of Endogenous Growth</td>
<td>4.5 CR</td>
<td>Ott</td>
</tr>
<tr>
<td>T-WIWI-102840</td>
<td>Innovation Theory and Policy</td>
<td>4.5 CR</td>
<td>Ott</td>
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</tbody>
</table>

**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.
6.58 Module: Innovation Economics [M-WIWI-101514]

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

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

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

<table>
<thead>
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<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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**Election block: Compulsory Elective Courses (between 9 and 10 credits)**

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<th>Course Title</th>
<th>Credits</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102840</td>
<td>Innovation Theory and Policy</td>
<td>4.5 CR</td>
<td>Ott</td>
<td></td>
<td></td>
<td>4</td>
<td>2</td>
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<tr>
<td>T-WIWI-102906</td>
<td>Methods in Economic Dynamics</td>
<td>1.5 CR</td>
<td>Ott</td>
<td></td>
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<td>4</td>
<td>2</td>
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<tr>
<td>T-WIWI-109864</td>
<td>Product and Innovation Management</td>
<td>3 CR</td>
<td>Klarmann</td>
<td></td>
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<td>4</td>
<td>2</td>
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<tr>
<td>T-WIWI-102789</td>
<td>Seminar in Economic Policy</td>
<td>3 CR</td>
<td>Ott</td>
<td></td>
<td></td>
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<td>2</td>
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</table>

**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.
### 6.59 Module: Innovation Management [M-WIWI-101507]

**Responsible:** Prof. Dr. Marion Weissenberger-Eibl  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Business Administration

<table>
<thead>
<tr>
<th>Compulsory Elective Modules (Business Administration)</th>
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<tbody>
<tr>
<td><strong>Credits</strong></td>
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<tr>
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#### Mandatory

<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>T-WIWI-102893</td>
<td>Innovation Management: Concepts, Strategies and Methods</td>
<td>3 CR</td>
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#### Election block: Compulsory Elective Courses (1 item)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>T-WIWI-102873</td>
<td>Current Issues in Innovation Management</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-110867</td>
<td>The negotiation of open innovation</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-108875</td>
<td>Digital Transformation and Business Models</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-102852</td>
<td>Case Studies Seminar: Innovation Management</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-108774</td>
<td>Analyzing and Evaluating Innovation Processes</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-110234</td>
<td>Innovation Processes Live</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-110263</td>
<td>Methods in Innovation Management</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-102853</td>
<td>Roadmapping</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-110987</td>
<td>Seminar Methods along the Innovation process</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-110986</td>
<td>Strategic Foresight China</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-109932</td>
<td>A Closer Look at Social Innovation</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-102858</td>
<td>Technology Assessment</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-102854</td>
<td>Technologies for Innovation Management</td>
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#### Election block: Supplementary Courses (1 item)

<table>
<thead>
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<tr>
<td>T-WIWI-102873</td>
<td>Current Issues in Innovation Management</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-102866</td>
<td>Design Thinking</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-110867</td>
<td>The negotiation of open innovation</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-108875</td>
<td>Digital Transformation and Business Models</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-102833</td>
<td>Entrepreneurial Leadership &amp; Innovation Management</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-102864</td>
<td>Entrepreneurship</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-102852</td>
<td>Case Studies Seminar: Innovation Management</td>
<td>3 CR</td>
</tr>
<tr>
<td>T-WIWI-108774</td>
<td>Analyzing and Evaluating Innovation Processes</td>
<td>3 CR</td>
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<td>T-WIWI-110234</td>
<td>Innovation Processes Live</td>
<td>3 CR</td>
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<tr>
<td>T-WIWI-110263</td>
<td>Methods in Innovation Management</td>
<td>3 CR</td>
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<td>T-WIWI-102853</td>
<td>Roadmapping</td>
<td>3 CR</td>
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<td>T-WIWI-110987</td>
<td>Seminar Methods along the Innovation process</td>
<td>3 CR</td>
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<td>T-WIWI-110986</td>
<td>Strategic Foresight China</td>
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<td>T-WIWI-109932</td>
<td>A Closer Look at Social Innovation</td>
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<td>Technologies for Innovation Management</td>
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<tr>
<td>T-WIWI-102858</td>
<td>Technology Assessment</td>
<td>3 CR</td>
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</tbody>
</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: Integrated Production Planning [M-MACH-101272]

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

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

<table>
<thead>
<tr>
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<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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<td>Each summer term</td>
<td>1 semester</td>
<td>German</td>
<td>4</td>
<td>3</td>
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</table>

**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 (Law or Sociology)

<table>
<thead>
<tr>
<th>Credits</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
<td>German</td>
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</table>

**Prerequisites**  
None

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## Election block: Intellectual Property Law (at least 1 item as well as at least 9 credits)

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
<th>Lecture</th>
<th>Tutors</th>
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<tbody>
<tr>
<td>T-INFO-102036</td>
<td>Computer Contract Law</td>
<td>3 CR</td>
<td>Bartsch</td>
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<tr>
<td>T-INFO-101308</td>
<td>Copyright</td>
<td>3 CR</td>
<td>Dreier</td>
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<tr>
<td>T-INFO-101310</td>
<td>Patent Law</td>
<td>3 CR</td>
<td>Hössle, Koch</td>
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<tr>
<td>T-INFO-101313</td>
<td>Trademark and Unfair Competition Law</td>
<td>3 CR</td>
<td>Matz</td>
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<tr>
<td>T-INFO-101307</td>
<td>Internet Law</td>
<td>3 CR</td>
<td>Dreier</td>
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</tr>
<tr>
<td>T-INFO-108462</td>
<td>Selected Legal Issues of Internet Law</td>
<td>3 CR</td>
<td>Dreier</td>
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</table>
Module: Lean Management in Construction [M-BGU-101884]

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

Mandatory

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Recurrence</th>
<th>Language</th>
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<th>Version</th>
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</thead>
<tbody>
<tr>
<td>T-BGU-108000</td>
<td>Lean Construction</td>
<td>4.5 CR</td>
<td>Each winter term</td>
<td>German</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>T-BGU-101007</td>
<td>Project Paper Lean Construction</td>
<td>1.5 CR</td>
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Election block: Electives (between 1 and 2 items as well as between 3 and 4.5 credits)

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<tr>
<td>T-BGU-103430</td>
<td>Turnkey Construction I - Processes and Methods</td>
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<tr>
<td>T-BGU-103431</td>
<td>Turnkey Construction II - Trades and Technology</td>
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<td>T-BGU-103433</td>
<td>Project Management in Construction and Real Estate Industry II</td>
<td>3 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.

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 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 Nachtragsmanagement are 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
6.63 Module: Logistics and Supply Chain Management [M-MACH-105298]

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

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

<table>
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Mandatory

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

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

Competence Goal
The student

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

Prerequisites
None

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

Learning type
Lectures, tutorials, case studies.

Literature
Dieter Arnold et. al.: Handbuch Logistik, 2008
Marc Goetschalkx: Supply Chain Engineering, 2011
Module: Machine Tools and Industrial Handling [M-MACH-101286]

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

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

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Mandatory

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

Competence Certificate
Written exam (120 minutes)

Competence Goal
The students

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

Prerequisites
None

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

The individual topics are:

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

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

Learning type
Lecture, exercise, excursio

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

**Organisation:** KIT Department of Mechanical Engineering

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

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<tr>
<td>T-MACH-105401</td>
<td>Integrated Product Development</td>
<td>18 CR</td>
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</table>

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

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

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

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

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

Responsible: Prof. Dr. Marcus Wouters

Organisation: KIT Department of Economics and Management

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

<table>
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<td>Management Accounting 1</td>
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<tr>
<td>T-WIWI-102801</td>
<td>Management Accounting 2</td>
<td>4,5 CR</td>
<td>Wouters</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.
6.67 Module: Manufacturing Technology [M-MACH-101276]

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

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

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<td>Each winter term</td>
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</table>

**Mandatory**

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

**Competence Certificate**

Written Exam (180 min)

**Competence Goal**

The students

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

**Prerequisites**

None

**Content**

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

**Workload**

regular attendance: 63 hours
self-study: 207 hours

**Learning type**

Lectures, exercise, excursion
6.68 Module: Market Engineering [M-WIWI-101446]

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

<table>
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Mandatory
T-WIWI-102640 Market Engineering: Information in Institutions 4,5 CR Weinhardt

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

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

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

Competence Goal
The students

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

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

Recommendation
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Marketing and Sales Management [M-WIWI-105312]

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

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

**Part of:** Business Administration

**Compulsory Elective Modules (Business Administration)**

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**Election block: Compulsory Elective Courses (at least 1 item)**

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<th>Course Title</th>
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<tr>
<td>T-WIWI-107720</td>
<td>Market Research</td>
<td>4.5 CR</td>
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<td>T-WIWI-109864</td>
<td>Product and Innovation Management</td>
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**Election block: Supplementary Courses (at most 1 item)**

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<th>Course Title</th>
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<tr>
<td>T-WIWI-102834</td>
<td>Case Studies in Sales and Pricing</td>
<td>1.5 CR</td>
<td>Klarmann</td>
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<tr>
<td>T-WIWI-111100</td>
<td>Current Directions in Consumer Psychology</td>
<td>3 CR</td>
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<td>T-WIWI-106981</td>
<td>Digital Marketing and Sales in B2B</td>
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<td>Judgment and Decision Making</td>
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<td>Marketing Strategy Business Game</td>
<td>1.5 CR</td>
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<td>T-WIWI-102891</td>
<td>Price Negotiation and Sales Presentations</td>
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<td>T-WIWI-110920</td>
<td>Real World Lab: Innovation Communication</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.

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

**Competence Goal**

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

**Prerequisites**

None

**Content**

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

**Annotation**

Please note that none of the listed 1.5-ECTS courses will take place in the winter semester 2020/21 due to a research semester. The courses concerned will probably be offered again from WS21/22 onwards.

Please note that only one of the listed 1.5-ECTS courses can be chosen in the module.

**Workload**

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

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

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

<table>
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<td>9</td>
<td>Each winter term</td>
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</table>

Mandatory

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

Competence Certificate

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

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

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

Competence Goal

The student

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

Prerequisites

none

Content

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

Workload

270 hours

Learning type

Lectures, tutorials.

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

**Organisation:** KIT Department of Mechanical Engineering

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

<table>
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<td>T-MACH-105189</td>
<td>Mathematical Models and Methods for Production Systems</td>
<td>6 CR</td>
<td>Baumann, Furmans</td>
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<tr>
<td>T-MACH-105151</td>
<td>Energy Efficient Intralogistic Systems</td>
<td>4 CR</td>
<td>Braun, Schönung</td>
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<td>T-MACH-111003</td>
<td>Global Logistics</td>
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<td>4 CR</td>
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**Election block: Material flow in interconnected logistics systems ()**

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

**Competence Goal**
The student

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

**Prerequisites**
none

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

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

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

**Learning type**
Lecture, tutorial.
Module: Mathematical Programming [M-WIWI-101473]

Responsibilities: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Research

Compulsory Elective Modules (Operations Research)

<table>
<thead>
<tr>
<th>Credits</th>
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<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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<td>Each term</td>
<td>1 semester</td>
<td>German/English</td>
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Election block: Compulsory Elective Courses (at most 2 items)

- T-WIWI-102719 Mixed Integer Programming I
- T-WIWI-102726 Global Optimization I
- T-WIWI-103638 Global Optimization I and II
- T-WIWI-102856 Convex Analysis
- T-WIWI-102724 Nonlinear Optimization I
- T-WIWI-103637 Nonlinear Optimization I and II
- T-WIWI-102855 Parametric Optimization

Election block: Supplementary Courses (at most 2 items)

- T-WIWI-106548 Advanced Stochastic Optimization
- T-WIWI-102720 Mixed Integer Programming II
- T-WIWI-102727 Global Optimization II
- T-WIWI-102723 Graph Theory and Advanced Location Models
- T-WIWI-106549 Large-scale Optimization
- T-WIWI-103124 Multivariate Statistical Methods
- T-WIWI-102725 Nonlinear Optimization II
- T-WIWI-102715 Operations Research in Supply Chain Management
- T-WIWI-110162 Optimization Models and Applications

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.
6.73 Module: Microeconomic Theory [M-WIWI-101500]

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

<table>
<thead>
<tr>
<th>Credits</th>
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Election block: Compulsory Elective Courses (at least 9 credits)

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<tbody>
<tr>
<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory</td>
<td>4.5 CR</td>
<td>Mitisch</td>
</tr>
<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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<tr>
<td>T-WIWI-102859</td>
<td>Social Choice Theory</td>
<td>4.5 CR</td>
<td>Puppe</td>
</tr>
<tr>
<td>T-WIWI-102613</td>
<td>Auction Theory</td>
<td>4.5 CR</td>
<td>Ehrhart</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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</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 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.
Module: Microfabrication [M-MACH-101291]

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

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

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Mandatory

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<tr>
<td>T-MACH-102166</td>
<td>Fabrication Processes in Microsystem Technology</td>
<td>3 CR</td>
<td>Bade</td>
</tr>
<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology</td>
<td>3 CR</td>
<td>Last</td>
</tr>
<tr>
<td>T-MACH-100530</td>
<td>Physics for Engineers</td>
<td>6 CR</td>
<td>Dienwiebel, Gumbsch, Nesterov-Müller, Weygand</td>
</tr>
<tr>
<td>T-MACH-102167</td>
<td>Nanotribology and -Mechanics</td>
<td>3 CR</td>
<td>Dienwiebel, Hölser</td>
</tr>
<tr>
<td>T-MACH-102191</td>
<td>Polymers in MEMS B: Physics, Microstructuring and Applications</td>
<td>3 CR</td>
<td>Worgull</td>
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<tr>
<td>T-MACH-102192</td>
<td>Polymers in MEMS A: Chemistry, Synthesis and Applications</td>
<td>3 CR</td>
<td>Rapp</td>
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<tr>
<td>T-MACH-102200</td>
<td>Polymers in MEMS C: Biopolymers and Bioplastics</td>
<td>3 CR</td>
<td>Rapp, Worgull</td>
</tr>
<tr>
<td>T-MACH-105556</td>
<td>Practical Course Polymers in MEMS</td>
<td>3 CR</td>
<td>Rapp, Worgull</td>
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<tr>
<td>T-MACH-109122</td>
<td>X-ray Optics</td>
<td>4 CR</td>
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Election block: Mikrofertigung (Ergänzungsbereich) (at least 6 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 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

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
6.75 Module: Microoptics [M-MACH-101292]

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

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

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

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<tr>
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<th>Recurrence</th>
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<th>Level</th>
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<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology</td>
<td>3 CR</td>
<td>Last</td>
<td></td>
<td></td>
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<tr>
<td>T-MACH-102165</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers</td>
<td>3 CR</td>
<td>Heckele, Mappes</td>
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<tr>
<td>T-MACH-101910</td>
<td>Microactuators</td>
<td>3 CR</td>
<td>Kohl</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-101945</td>
<td>Optical Waveguides and Fibers</td>
<td>4 CR</td>
<td>Koos</td>
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<tr>
<td>T-MACH-109122</td>
<td>X-ray Optics</td>
<td>4 CR</td>
<td>Last</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
The student
- basic knowledge 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
- knowledge on X-ray imaging methods

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]**

**Responsible:** Prof. Dr. Jan Gerrit Korvink  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** Engineering Sciences  
Compulsory Elective Modules (Engineering Sciences)

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

### Election block: Mikrosystemtechnik (at least 9 credits)

<table>
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<tr>
<td>T-MACH-102165</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers</td>
<td>3</td>
<td>3 CR</td>
<td>Heckele, Mappes</td>
</tr>
<tr>
<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II</td>
<td>3</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>
<td>3</td>
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<tr>
<td>T-MACH-102172</td>
<td>Bionics for Engineers and Natural Scientists</td>
<td>3</td>
<td>3 CR</td>
<td>Hölscher</td>
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<tr>
<td>T-MACH-105182</td>
<td>Introduction to Microsystem Technology I</td>
<td>3</td>
<td>3 CR</td>
<td>Badiïta, Jouda, Korvink</td>
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<tr>
<td>T-MACH-105183</td>
<td>Introduction to Microsystem Technology II</td>
<td>3</td>
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<td>3 CR</td>
<td>Kohl</td>
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<td>T-MACH-102080</td>
<td>Nanotechnology with Clusterbeams</td>
<td>3</td>
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<td>Novel Actuators and Sensors</td>
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<td>4</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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### 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
Module: Mobile Machines [M-MACH-101267]

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

** Organisation:** KIT Department of Mechanical Engineering

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

<table>
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** Mandatory**

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<td>T-MACH-110959</td>
<td>Basics of Mobile Working Machines</td>
<td>9 CR</td>
<td>Geimer</td>
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</table>

** Competence Certificate**
The assessment is carried out as a general oral exam of the single courses of this module. The overall grade of the module is the grade of the oral examination.

** Competence Goal**
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 student is able to

- apply and evaluate the physical principles of hydrostatics,
- name common components and explain how they work,
- calculate hydrostatic systems,
- describe mobile working machines,
- characterize fields of application of the machines,
- describe the construction of the machine.

After a successful participation:

- the student can name the wide range of mobile working machines
- the student knows the possible applications and processes of the most important mobile working machines
- the student can describe selected subsystems and components

** Content**
In the module of Mobile Machines [WI4INGMB15] the students will learn the structure of the machines and basics of hydraulics. The module is practically orientated and supported by industry partners.

**Workload**
270 hours

** Learning type**
- Research-oriented teaching
- lectures
- exercises
### 6.78 Module: Module Master Thesis [M-WIWI-101650]

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

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

**Part of:** Master Thesis

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<td>4</td>
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</table>

**Mandatory**

| T-WIWI-103142 | Master Thesis | 30 CR |

**Competence Certificate**

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

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

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

With consent of the 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.

**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 examiner. 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]**

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** Engineering Sciences

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</table>

**Compulsory Elective Modules (Engineering Sciences)**

### Mandatory
- **T-MACH-105180** Nanotechnology for Engineers and Natural Scientists (4 CR) Dienwiebel, Hölscher, Walheim

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

**Competence Certificate**

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

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

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

**Prerequisites**
none

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

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

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

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

**Part of:** Engineering Sciences

<table>
<thead>
<tr>
<th>Credits</th>
<th>Recurrence</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
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<tr>
<td>9</td>
<td>Each term</td>
<td>German</td>
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**Election block: Wahlpflichtangebot (between 9 and 12 credits)**

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>T-BGU-101499</td>
<td>Introduction to Hydrogeology</td>
<td>5 CR</td>
<td>Goldscheider</td>
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<tr>
<td>T-BGU-108943</td>
<td>Engineering Hydrology</td>
<td>3 CR</td>
<td>Ehret</td>
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<tr>
<td>T-BGU-106597</td>
<td>Management of Water Resources and River Basins</td>
<td>6 CR</td>
<td>Ehret</td>
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<tr>
<td>T-BGU-101859</td>
<td>Morphodynamics</td>
<td>3 CR</td>
<td>Nestmann</td>
</tr>
<tr>
<td>T-BGU-106620</td>
<td>Examination Prerequisite Environmental Communication</td>
<td>0 CR</td>
<td>Kämpf</td>
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<tr>
<td>T-BGU-101676</td>
<td>Environmental Communication</td>
<td>4 CR</td>
<td>Kämpf</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**

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 (Economics)**

- **Credits:** 9
- **Recurrence:** Each term
- **Language:** German/English
- **Level:** 4
- **Version:** 2

<table>
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<th>Election block: Compulsory Elective Courses (9 credits)</th>
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<tbody>
<tr>
<td>T-WIWI-100005</td>
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<tr>
<td>T-WIWI-100007</td>
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<td>T-WIWI-102609</td>
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<tr>
<td>T-WIWI-102712</td>
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<tr>
<td>T-WIWI-102713</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.
### 6.82 Module: Operations Research in Supply Chain Management [M-WIWI-102832]

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

<table>
<thead>
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#### Election block: Compulsory Elective Courses (at most 2 items)

<table>
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<tr>
<th>Course ID</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>T-WIWI-102723</td>
<td>Graph Theory and Advanced Location Models</td>
<td>4,5 CR</td>
<td>Nickel</td>
</tr>
<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>
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#### Election block: Supplementary Courses (at most 2 items)

<table>
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<th>Course Name</th>
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<th>Teacher</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>
</tr>
<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-110162</td>
<td>Optimization Models and Applications</td>
<td>4,5 CR</td>
<td>Sudermann-Merx</td>
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<tr>
<td>T-WIWI-106549</td>
<td>Large-scale Optimization</td>
<td>4,5 CR</td>
<td>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

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

**Prerequisites**

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

Students who choose the module in the field "compulsory elective modules" may select any two courses of the module.
Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

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

<table>
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<th>Version</th>
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<td>9</td>
<td>Each term</td>
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**Election block: Optoelektronik und Optische Kommunikationstechnik (Kernbereich) (1 item)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecturer(s)</th>
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<tbody>
<tr>
<td>T-ETIT-100639</td>
<td>Optical Transmitters and Receivers</td>
<td>6 CR</td>
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**Election block: Optoelektronik und Optische Kommunikationstechnik (Ergänzungsbereich) (at least 5 credits)**

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

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 (Engineering Sciences)

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

**Competence Goal**

See German version.

**Prerequisites**

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

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

**Organisation:** KIT Department of Informatics

**Part of:** Compulsory Elective Modules (Law or Sociology)

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<td>Each term</td>
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**Election block: Private Business Law (at least 1 item as well as at least 9 credits)**

<table>
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<th>Credits</th>
<th>Lecturer</th>
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<tr>
<td>T-INFO-101329</td>
<td>Employment Law I</td>
<td>3 CR</td>
<td>Hoff</td>
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<tr>
<td>T-INFO-101330</td>
<td>Employment Law II</td>
<td>3 CR</td>
<td>Hoff</td>
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<tr>
<td>T-INFO-101315</td>
<td>Tax Law I</td>
<td>3 CR</td>
<td>Dietrich</td>
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<tr>
<td>T-INFO-101314</td>
<td>Tax Law II</td>
<td>3 CR</td>
<td>Dietrich</td>
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<tr>
<td>T-INFO-101316</td>
<td>Law of Contracts</td>
<td>3 CR</td>
<td>Hoff</td>
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</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]

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

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

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Engineering Sciences)**

<table>
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<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>9</td>
<td>Each winter term</td>
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### Mandatory

<table>
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<tr>
<td>T-BGU-101844</td>
<td>Process Engineering</td>
<td>3 CR</td>
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### Election block: Electives (between 2 and 3 items as well as between 6 and 7.5 credits)

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<tr>
<td>T-BGU-101845</td>
<td>Construction Equipment</td>
<td>3 CR</td>
<td>Gentes</td>
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<tr>
<td>T-BGU-101832</td>
<td>Operation Methods for Foundation and Marine Construction</td>
<td>1.5 CR</td>
<td>Schneider</td>
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<tr>
<td>T-BGU-101801</td>
<td>Operation Methods for Earthmoving</td>
<td>1.5 CR</td>
<td>Schlick</td>
</tr>
<tr>
<td>T-BGU-101846</td>
<td>Tunnel Construction and Blasting Engineering</td>
<td>3 CR</td>
<td>Haghsheno</td>
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<tr>
<td>T-BGU-101847</td>
<td>Project Studies</td>
<td>3 CR</td>
<td>Gentes</td>
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<tr>
<td>T-BGU-101850</td>
<td>Disassembly Process Engineering</td>
<td>3 CR</td>
<td>Gentes</td>
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### Competence Certificate

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

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

### Competence Goal

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

### Module grade calculation

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

### Prerequisites

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

### Content

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

### Recommendation

None

### Annotation

None

### Workload

See German version
Module: Project Management in Construction [M-BGU-101888]

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

<table>
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Mandatory

- T-BGU-103432 Project Management in Construction and Real Estate Industry I 3 CR Haghsheno
- T-BGU-103431 Turnkey Construction II - Trades and Technology 3 CR Haghsheno

Election block: Electives (between 1 and 2 items as well as between 3 and 4.5 credits)

- T-BGU-103427 Site Management 1.5 CR Haghsheno
- T-BGU-103430 Turnkey Construction I - Processes and Methods 1.5 CR Haghsheno
- T-BGU-103428 Supplementary Claim Management 1.5 CR Haghsheno
- T-BGU-103429 Building Laws 3 CR Haghsheno
- T-BGU-103433 Project Management in Construction and Real Estate Industry II 3 CR Haghsheno

Competence Certificate
- ‘Teilleistung’ T-BGU-103432 with written examination according to § 4 Par. 2 No. 1
- ‘Teilleistung’ T-BGU-103431 with oral examination according to § 4 Par. 2 No. 2
  according to selected course:
- ‘Teilleistung’ T-BGU-103427 with written 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, Zeitechnik-Verlag, Neu-Isenburg, 2000
6.88 Module: Public Business Law [M-INFO-101217]

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

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

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<tr>
<td>T-INFO-101309</td>
<td>Telecommunications Law</td>
<td>3 CR</td>
<td>Hermstrüwer</td>
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<tr>
<td>T-INFO-101303</td>
<td>Data Protection Law</td>
<td>3 CR</td>
<td>Eichenhofer</td>
</tr>
<tr>
<td>T-INFO-101311</td>
<td>Public Media Law</td>
<td>3 CR</td>
<td>Dreier</td>
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<td>T-INFO-101312</td>
<td>European and International Law</td>
<td>3 CR</td>
<td>Brühan</td>
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<tr>
<td>T-INFO-101348</td>
<td>Environmental Law</td>
<td>3 CR</td>
<td>Eichenhofer</td>
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**Competence Certificate**  
see course description.
6.89 Module: Rail System Technology [M-MACH-101274]

Responsibility: Prof. Dr.-Ing. Peter Gratzfeld

Organisation: KIT Department of Mechanical Engineering

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

<table>
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Mandatory

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<tbody>
<tr>
<td>T-MACH-102143</td>
<td>Rail System Technology</td>
<td>9 CR</td>
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</table>

Competence Certificate
Oral examination

Duration: ca. 45 minutes

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

Competence Goal

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- Based on operating requirements and legal framework they derive the requirements concerning a capable infrastructure and suitable concepts of rail vehicles.
- They recognize the impact of alignment, understand the important function of the wheel-rail-contact and estimate the impact of driving dynamics on the operating program.
- They evaluate the impact of operating concepts on safety and capacity of a rail system.
- They know the infrastructure to provide power supply to rail vehicles with different drive systems.
- The students learn the role of rail vehicles and understand their classification. They understand the basic structure and know the functions of the main systems. They understand the overall tasks of vehicle system technology.
- They learn functions and requirements of car bodies and judge advantages and disadvantages of design principles. They know the functions of the car body's interfaces.
- They know about the basics of running dynamics and bogies.
- The students learn about advantages and disadvantages of different types of traction drives and judge, which one fits best for each application.
- They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems.
- They know the basic setup of train control management system and understand the most important functions.
- They specify and define suitable vehicle concepts based on requirements for modern rail vehicles.

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, power networks, filling stations
8. Vehicle system technology: structure and main systems of rail vehicles
9. Car body: functions, requirements, design principles, crash elements, interfaces
10. Bogies: forces, running gears, bogies, axle configuration
11. Drives: principles, electric powertrains, non-electric powertrains
12. Brakes: basics, principles, brake control
13. Train control management system: definitions, bus systems, components, network architecture, examples, trends

Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020
Annotation
A bibliography is available for download (Ilias-platform).
The lectures can be attended in the same term.

Workload
1. Regular attendance: 42 hours
2. Self-study: 42 hours
3. Exam and preparation: 186 hours

Learning type
Lectures
Module: Safety, Computing and Law in Highway Engineering [M-BGU-101066]

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

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

**Part of:** Engineering Sciences

Compulsory Elective Modules (Engineering Sciences)

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<td>T-BGU-101804</td>
<td>IT-Based Road Design</td>
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<td>T-BGU-101674</td>
<td>Safety Management in Highway Engineering</td>
<td>3 CR</td>
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<td>T-BGU-106615</td>
<td>Laws concerning Traffic and Roads</td>
<td>3 CR</td>
<td>Hönig</td>
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</table>

**Competence Goal**

See German version.

**Prerequisites**

The examination "Design Basics in Highway Engineering" has to be passed. This can be taken either in the module "Design, Construction, Operation and Maintenance of Highways" (WI4INGBGU1) or can be approved from a previous study (e.g. Civil Engineering BSc at KIT).

**Recommendation**

None

**Annotation**

None
## 6.91 Module: Seminar Module [M-WIWI-101808]

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

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### Election block: Seminar in Economics and Management, Mathematics and Law (between 3 and 6 credits)

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<tr>
<td>T-WIWI-103476</td>
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<td>T-WIWI-103477</td>
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<tr>
<td>T-WIWI-103481</td>
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<td>Nickel, Rebennack, Stein</td>
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<td>T-INFO-101997</td>
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<td>T-INFO-105945</td>
<td>Seminar: Legal Studies II</td>
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### Election block: Seminar in Engineering Science (at most 1 item)

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<td>T-MACH-102135</td>
<td>Conveying Technology and Logistics</td>
<td>3 CR</td>
<td>Furmans, Pagani</td>
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<td>T-MACH-109062</td>
<td>Seminar Production Technology</td>
<td>3 CR</td>
<td>Fleischer, Lanza, Schulze</td>
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<tr>
<td>T-MACH-108737</td>
<td>Seminar Data-Mining in Production</td>
<td>3 CR</td>
<td>Lanza</td>
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<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-108763</td>
<td>Seminar in Engineering Science Master (approval)</td>
<td>3 CR</td>
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### Election block: SQ-Seminar (between 3 and 4 credits)

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<td>T-WIWI-104681</td>
<td>Wildcard Key Competences Seminar 2</td>
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<td>Wildcard Key Competences Seminar 5</td>
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<td>Wildcard Key Competences Seminar 8</td>
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Competence Certificate
The module examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examination regulation). A detailed description of every singled assessment is given in the specific course characterization. The final mark for the module is the average of the marks for each of the two seminars weighted by the credits and truncated after the first decimal. Grades of the KQ courses are not included.

Competence Goal
- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Prerequisites
The course specific preconditions must be observed.
- **Seminars:** Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.
- Alternatively one of the two seminars can be absolved at a engineering department. The seminar has to be offered by a representative of the respective department as well. The assessment has to meet the demands of the Department of Economics and Management (active participation, term paper with a workload of at least 80 h, presentation). This alternative seminar requires an official approval and can be applied at the examination office of the Department of Economics and Management. Seminars at the institutes wbk and IFL do not require these approval.
- **Key Qualification (KQ)-course(s):** One or more courses with at least 3 CP in total of additional key qualifications have to be chosen among the courses [HoC, ZAK, Sprachenzentrum].

Content
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor. Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A 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.
Module: Sensor Technology I [M-ETIT-101158]

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

**Credits:** 9  
**Recurrence:** Each summer term  
**Level:** 4  
**Version:** 3

| Mandatory | | | | |
|-----------|-----------|-------|-------|
| T-ETIT-101911 | Sensors | 3 CR | Menesklou |

**Election block:** Compulsory Elective (at most 2 items as well as at least 6 credits)

| | | | | |
|-----------|-----------|-------|-------|
| T-ETIT-100707 | Seminar Sensors | 3 CR | Menesklou |
| T-MACH-101910 | Microactuators | 3 CR | Kohl |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology | 3 CR | Last |
| T-MACH-105182 | Introduction to Microsystem Technology I | 3 CR | Badilila, Jouda, Korvink |
| T-MACH-105183 | Introduction to Microsystem Technology II | 3 CR | Jouda, Korvink |

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

**Prerequisites**  
The course Sensor Technology [23231] is obligatory and has to be attended. The elected courses must not be credited in other modules.

**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.
6.93 Module: Service Analytics [M-WIWI-101506]

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

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

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

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**Election block: Compulsory Elective Courses (9 credits)**

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<td>T-WIWI-108715</td>
<td>Artificial Intelligence in Service Systems</td>
<td>4.5</td>
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<td>T-WIWI-105777</td>
<td>Business Intelligence Systems</td>
<td>4.5</td>
<td>Mäde, Nadji, Toreini</td>
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<td>T-WIWI-102899</td>
<td>Modeling and Analyzing Consumer Behavior with R</td>
<td>4.5</td>
<td>Dorner, Weinhardt</td>
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<td>T-WIWI-105778</td>
<td>Service Analytics A</td>
<td>4.5</td>
<td>Fromm</td>
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<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**

Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

**Prerequisites**
None

**Content**
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

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

**Annotation**
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksei.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 (Business Administration)

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

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

Competence Certificate
The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

Competence Goal

- Deep knowledge of the innovation method Design Thinking, as introduced and promoted by Stanford University
- Development of new, creative solutions through extensive observation of oneself and one's environment, in particular with regard to the relevant service users
- Know how to use prototyping and experimentation to visualize one's ideas, to test and iteratively develop them, and to converge on a solution
- Learn to apply the method to a real innovation projects issued by industry partners.

Prerequisites
None

Content

- Paper Bike: Learning about the basic method elements by building a paper bike that has to fulfill a given set of challenges. The bikes will be tested in a race during an international Kick-Off event with other universities of the SUGAR network (intern. Design Thinking network).
- Design Space Exploration: Exploring the problem space through customer and user observation as well as desk research.
- Critical Function Prototype: Identification of critical features from the customer's perspective that can contribute to the solution of the overarching problem. Building and testing prototypes that integrate these functionalities.
- Dark Horse Prototype: Inverting earlier assumptions and experiences, which leads to the inclusion of new features and solutions. Developing radically new ideas are in the focus of this phase.
- Funky Prototype: Integration of the individually tested and successful functions to several complete solution scenarios, which are further tested and developed.
- Functional Prototype: Selection of successful scenarios from the previous phase and building a higher resolution prototype. The final solution to the challenge is laid 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.
6.95 Module: Service Economics and Management [M-WIWI-102754]

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

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

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

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**Election block: Compulsory Elective Courses (9 credits)**

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<td>T-WIWI-110280</td>
<td>Digital Services: Business Models and Transformation</td>
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<td>Market Engineering: Information in Institutions</td>
<td>4.5</td>
<td>Weinhardt</td>
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**Compentence Certificate**

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

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

**Competence Goal**

**Students**

- understand the scientific basics of the management of digital services and corresponding systems
- gain a comprehensive insight in the importance and the most important features of information systems as an central component of the digitalization of business processes, products and services
- know the most relevant concepts and theories to shape the digital transformation process of service systems successfully
- understand the OR methods in the sector of service management and apply them adequately
- are able to use large amounts of available data systematically for the planning, operation and improvement of complex service offers and to design and control information systems
- are able to develop market-oriented coordination mechanisms and apply service systems.

**Prerequisites**

None

**Content**

This module provides the foundation for the management of digital services and corresponding systems. The courses in this module cover the major concepts for a successful management of service systems and their digital transformation. Current examples from the research and practice enhance the relevance of the discussed topics.

**Recommendation**

None

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.96 Module: Service Innovation, Design & Engineering [M-WIWI-102806]

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

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

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

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**Election block: Compulsory Elective Courses (9 credits)**

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<th>Credits</th>
<th>Responsible</th>
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<tbody>
<tr>
<td>T-WIWI-110877</td>
<td>Engineering Interactive Systems</td>
<td>4.5 CR</td>
<td>CR Weinhardt</td>
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<tr>
<td>T-WIWI-102639</td>
<td>Business Models in the Internet: Planning and Implementation</td>
<td>4.5 CR</td>
<td>CR Weinhardt</td>
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<tr>
<td>T-WIWI-110887</td>
<td>Practical Seminar: Service Innovation</td>
<td>4.5 CR</td>
<td>CR Satzger</td>
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<tr>
<td>T-WIWI-108437</td>
<td>Practical Seminar: Information Systems and Service Design</td>
<td>4.5 CR</td>
<td>CR Mädche</td>
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<tr>
<td>T-WIWI-102641</td>
<td>Service Innovation</td>
<td>4.5 CR</td>
<td>CR Satzger</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

- 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 (Business Administration)

<table>
<thead>
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<th>Language</th>
<th>Level</th>
<th>Version</th>
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Mandatory

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<tr>
<td>T-WIWI-110280</td>
<td>Digital Services: Business Models and Transformation</td>
<td>4,5</td>
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Election block: Supplementary Courses (4,5 credits)

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<tr>
<td>T-WIWI-108715</td>
<td>Artificial Intelligence in Service Systems</td>
<td>4,5</td>
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<tr>
<td>T-WIWI-102899</td>
<td>Modeling and Analyzing Consumer Behavior with R</td>
<td>4,5</td>
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<td>4,5</td>
<td>Fromm</td>
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<tr>
<td>T-WIWI-102641</td>
<td>Service Innovation</td>
<td>4,5</td>
<td>Satzger</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 available data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

Prerequisites

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

Content

The module service management addresses the basics of developing and managing IT-based services. The lectures contained in this module teach the basics of developing and managing IT-based services and the application of OR methods in the field of service management. Moreover, students learn to systematically analyze vast amounts of data for planning, operation and improvement for complex service offerings. These tools enhance operational and strategic decision support and help to analyze and understand the overall innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

Recommendation

None

Workload

The total workload for this module is approximately 270 hours. For further information see German version.
6.98 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)**

<table>
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**Election block: Compulsory Elective Courses (at most 2 items)**

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<td>T-WIWI-102718</td>
<td>Discrete-Event Simulation in Production and Logistics</td>
<td>4.5</td>
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<tr>
<td>T-WIWI-102884</td>
<td>Operations Research in Health Care Management</td>
<td>4.5</td>
<td>CR</td>
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<tr>
<td>T-WIWI-102715</td>
<td>Operations Research in Supply Chain Management</td>
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<tr>
<td>T-WIWI-102716</td>
<td>Practical Seminar: Health Care Management (with Case Studies)</td>
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**Election block: Supplementary Courses (at most 2 items)**

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<tr>
<td>T-WIWI-102872</td>
<td>Challenges in Supply Chain Management</td>
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<td>T-WIWI-110971</td>
<td>Demand-Driven Supply Chain Planning</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), 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 (Law or Sociology)

<table>
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<td>Computer Aided Data Analysis</td>
<td>0 CR</td>
<td>Nollmann</td>
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<tr>
<td>T-GEISTSOZ-109052</td>
<td>Application of Social Science Methods (WiWi)</td>
<td>9 CR</td>
<td>Nollmann</td>
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</table>

**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 exercise 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.
6.100 Module: Specialization in Food Process Engineering [M-CIWVT-101119]

**Responsible:** Dr. Volker Gaukel

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

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Engineering Sciences)**

<table>
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<th>Level</th>
<th>Version</th>
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<td>Each term</td>
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<tr>
<td>T-CIWVT-101875</td>
<td>Specialization in Food Process Engineering</td>
<td>9 CR</td>
<td>4</td>
<td>Gaukel</td>
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</table>

**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]

### Responsible
Prof. Dr.-Ing. Volker Schulze

### Organisation
KIT Department of Mechanical Engineering

### Part of
- Engineering Sciences
- Compulsory Elective Modules (Engineering Sciences)

### Credits
9

### Recurrence
Each term

### Language
German

### Level
4

### Version
4

#### Election block: Vertiefung der Produktionstechnik (at least 9 credits)

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<td>T-MACH-110176</td>
<td>Digitalization from Production to the Customer in the Optical Industry</td>
<td>4 CR</td>
<td>Wawerla</td>
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<tr>
<td>T-MACH-110991</td>
<td>Global Production</td>
<td>4 CR</td>
<td>Lanza</td>
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<tr>
<td>T-MACH-110981</td>
<td>Tutorial Global Production</td>
<td>1 CR</td>
<td>Lanza</td>
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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 &quot;Global Production&quot;</td>
<td>6 CR</td>
<td>Lanza</td>
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<tr>
<td>T-MACH-108878</td>
<td>Laboratory Production Metrology</td>
<td>5 CR</td>
<td>Häfner</td>
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<tr>
<td>T-MACH-110318</td>
<td>Product- and Production-Concepts for modern Automobiles</td>
<td>4 CR</td>
<td>Kienzle, Steegmüller</td>
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<tr>
<td>T-MACH-110984</td>
<td>Production Technology for E-Mobility</td>
<td>4 CR</td>
<td>Fleischer, Hofmann</td>
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<tr>
<td>T-MACH-110960</td>
<td>Project Internship Additive Manufacturing: Development and Production of an Additive Component</td>
<td>4 CR</td>
<td>Zanger</td>
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<td>T-MACH-102107</td>
<td>Quality Management</td>
<td>4 CR</td>
<td>Lanza</td>
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<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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<td>T-MACH-102148</td>
<td>Gear Cutting Technology</td>
<td>4 CR</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
- are able to apply the methods of production science to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

### Prerequisites
none

### Content
Within this module the students will get to know and learn about production science. Manifold lectures and excursions as part of several lectures provide specific insights into the field of production science.

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

### Learning type
Lectures, seminars, workshops, excursions
6 MODULES

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

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

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

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

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<tr>
<td>T-MACH-102141</td>
<td>Constitution and Properties of Wearresistant Materials</td>
<td>4 CR</td>
<td>Ulrich</td>
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<tr>
<td>T-MACH-100287</td>
<td>Introduction to Ceramics</td>
<td>6 CR</td>
<td>Hoffmann</td>
</tr>
<tr>
<td>T-MACH-102099</td>
<td>Experimental Lab Class in Welding Technology, in Groups</td>
<td>4 CR</td>
<td>Dietrich</td>
</tr>
<tr>
<td>T-MACH-102111</td>
<td>Principles of Ceramic and Powder Metallurgy Processing</td>
<td>4 CR</td>
<td>Schell</td>
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<tr>
<td>T-MACH-102154</td>
<td>Laboratory Laser Materials Processing</td>
<td>4 CR</td>
<td>Schneider</td>
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<tr>
<td>T-MACH-102102</td>
<td>Physical Basics of Laser Technology</td>
<td>5 CR</td>
<td>Schneider</td>
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<td>T-MACH-102137</td>
<td>Polymer Engineering I</td>
<td>4 CR</td>
<td>Elsner, Liebig</td>
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<td>T-MACH-102138</td>
<td>Polymer Engineering II</td>
<td>4 CR</td>
<td>Elsner, Liebig</td>
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<tr>
<td>T-MACH-102103</td>
<td>Superhard Thin Film Materials</td>
<td>4 CR</td>
<td>Ulrich</td>
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<tr>
<td>T-MACH-100531</td>
<td>Systematic Materials Selection</td>
<td>4 CR</td>
<td>Dietrich, Schulze</td>
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<tr>
<td>T-MACH-102139</td>
<td>Failure of Structural Materials: Fatigue and Creep</td>
<td>4 CR</td>
<td>Gruber, Gumbsch</td>
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<tr>
<td>T-MACH-102140</td>
<td>Failure of Structural Materials: Deformation and Fracture</td>
<td>4 CR</td>
<td>Gumbsch, Weygand</td>
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<tr>
<td>T-MACH-102157</td>
<td>High Performance Powder Metallurgy Materials</td>
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<td>T-MACH-102179</td>
<td>Structural Ceramics</td>
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<td>Hoffmann</td>
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<td>T-MACH-102182</td>
<td>Ceramic Processing Technology</td>
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<td>Binder</td>
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<td>T-MACH-102170</td>
<td>Structural and Phase Analysis</td>
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<tr>
<td>T-MACH-105150</td>
<td>Constitution and Properties of Protective Coatings</td>
<td>4 CR</td>
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<td>T-MACH-105170</td>
<td>Welding Technology</td>
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<td>T-MACH-105164</td>
<td>Laser in Automotive Engineering</td>
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<td>T-MACH-105157</td>
<td>Foundry Technology</td>
<td>4 CR</td>
<td>Wilhelm</td>
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<td>Practical Course Technical Ceramics</td>
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<td>T-MACH-105179</td>
<td>Functional Ceramics</td>
<td>4 CR</td>
<td>Hinterstein, Rheinheimer</td>
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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.

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.

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

Prerequisites
None

Content
See courses.
Workload
The module requires an average workload of 270 hours.

Learning type
Lecture, Tutorials.
6.103 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: Compulsory Elective Courses (between 1 and 2 Items)**

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<td>Introduction to Stochastic Optimization</td>
<td>4.5 CR</td>
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<tr>
<td>T-WIWI-106548</td>
<td>Advanced Stochastic Optimization</td>
<td>4.5 CR</td>
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<td>Large-scale Optimization</td>
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**Election block: Supplementary Courses (at most 1 item)**

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<td>Graph Theory and Advanced Location Models</td>
<td>4.5 CR</td>
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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>Mixed Integer Programming II</td>
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<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</td>
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<td>T-WIWI-102715</td>
<td>Operations Research in Supply Chain Management</td>
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<td>Optimization Models and Applications</td>
<td>4.5 CR</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", "Large-scale Optimization" or "Introduction to Stochastic 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 winter semester 2020/21 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.
Module: Strategic Design of Modern Production Systems [M-MACH-105455]

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

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

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Election block: Strategic Design of Modern Production Systems (at least 9 credits)

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<td>Digitalization from Production to the Customer in the Optical Industry</td>
<td>4 CR</td>
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<td>T-MACH-110991</td>
<td>Global Production</td>
<td>4 CR</td>
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<tr>
<td>T-MACH-110981</td>
<td>Tutorial Global Production</td>
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<td>T-MACH-105188</td>
<td>Integrative Strategies in Production and Development of High Performance Cars</td>
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<td>Schlichtenmayer</td>
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<td>T-MACH-105783</td>
<td>Learning Factory &quot;Global Production&quot;</td>
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<tr>
<td>T-MACH-110318</td>
<td>Product- and Production-Concepts for modern Automobiles</td>
<td>4 CR</td>
<td>Kienzle, Steegmüller</td>
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<tr>
<td>T-MACH-102107</td>
<td>Quality Management</td>
<td>4 CR</td>
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</table>

Competence Certificate
Oral exams: duration approx. 5 min per credit point
Written exams: duration approx. 20 - 25 min per credit point

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

Competence Goal
The students

- are able to apply the methods of the strategic design of modern production systems to new problems.
- are able to outline the underlying conditions and influencing factors of today's production and derive recommendations for action for an integrated strategy.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

Prerequisites
none

Content
Within this module the students will get to know and learn about methods for the strategic design of modern production systems. Manifold lectures and excursions as part of several lectures provide specific insights into the field of science.

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

Learning type
Lectures, seminars, workshops, excursions
6.105 Module: Student Innovation Lab (SIL) 1 [M-WIWI-105010]

**Responsible:** Prof. Dr.-Ing. Sören Hohmann  
Prof. Dr. Orestis Terzidis

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

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<td>T-WIWI-110166</td>
<td>SIL Entrepreneurship Project</td>
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<td>T-WIWI-110287</td>
<td>SIL Entrepreneurship Emphasis</td>
<td>3</td>
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**Competence Certificate**

The assessment of this module comprises a written examination of 60 minutes on the lecture contents of the lecture "Entrepreneurship" as well as two seminars. All examinations are graded. In both seminars the following tasks have to be fulfilled:

- "SIL Entrepreneurship Project": Presentation of the Value Profile & submission of the Business Plan
- "SIL Entrepreneurship Emphasis": Submission of price calculation, market potential analysis, competition analysis, financial plan, risk analysis, decision basis for funding and legal form

In addition, both courses provide for smaller, ungraded tasks to monitor progress.

The grade consists of 60 % of the written examination, 20 % of the examination "SIL Entrepreneurship Project" and 20 % of the examination "SIL Entrepreneurship Advanced".
Competence Goal

Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
- Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
- Conflict ability: Students can recognise conflicts at an early stage, analyse conflict situations and name solution concepts.

Innovation and Entrepreneurship Competence

- Agile product development: Students can apply methods of agile product development such as Scrum.
- Methodical innovation finding: Students can perform user- or technology-centric innovation processes to develop sustainable value propositions for dedicated target groups (e.g. Design Thinking (DT), Technology Application Selection (TAS) process).
- Orientation on the management of new technology-based companies (NTBF): Students can name the central concepts of intellectual property and legal form. Students can name the most important tasks of entrepreneurial leadership. They can identify the relevant forms of business modelling and draw up a business plan. Students know the central approaches to building an organisation. Students will be able to identify the ownership structure of investments and how to develop a strategy. The students can name marketing concepts and create a business model.
- Create investment readiness: The students are able to create a rudimentary sales and cost planning. Furthermore, they are able to create a project plan for a company and derive an investment plan from it. The students can present the business plan to potential investors and develop investor empathy.
- Business model development competence: Students are able to use relevant tools for business modelling, e.g. the Business Model Canvas. Students can develop and evaluate alternative business models.
- Dealing with risks: Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

- Problem-solving competence: Students can analyse, assess and solve a technical problem in a structured way.
- Agile Methodology of System Development: Students can name the different system development processes and apply them appropriately.
- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Prerequisites
The module can only be completed together with the module M-WIWI-105011 “Student Innovation Lab 2”.

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.
Content
In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one’s own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

- As an innovation platform, the Automation Innovation Lab offers flying robots for cooperative swarm solutions.
- The Industry 4.0 Innovation Lab enables innovations in the area of the next industrial revolution with mobile robot platforms.
- In the Internet of Things Innovation Lab, innovations in Assisted Living and Smart Housing are made possible by a comprehensive kit of mobile robots and sensors.

The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Annotation

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module. The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.
6.106 Module: Student Innovation Lab (SIL) 2 [M-WIWI-105011]

**Responsible:**
- Prof. Dr.-Ing. Sören Hohmann
- Prof. Dr.-Ing. Eric Sax
- Prof. Dr. Wilhelm Stork
- Prof. Dr. Orestis Terzidis
- Prof. Dr.-Ing. Thomas Zwick

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

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

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<td>Each winter term</td>
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</table>

**Mandatory**

| T-ETIT-110291 | Innovation Lab | 9 CR | Hohmann, Sax, Stork, Zwick |

**Competence Certificate**

The examination in this module comprises the submission of graded intermediate results in the form of prototypes (low fidelity and high fidelity) as well as various technical and economic reports (according to § 4 (2), 3 SPO):

1. Submission of a technical report with requirements list and system architectur
2. Submission of the reflection of the gate plans
3. Presentation of the High-fidelity

The module grade consists of 50% of the evaluation of the low fidelity prototype including intermediate results of a technical and economic nature and 50% of the evaluation of the high fidelity prototype including intermediate results of a technical and economic nature.
Competence Goal

Personal competence

- Ability to reflect: Students can analyse certain elements of their actions in social interaction, critically assess them and develop alternative actions.
- Decision-making ability: Students can prepare a decision template in due time and provide the necessary factual arguments for alternative decisions and thus make timely decisions.
- Interdisciplinary cooperation: Students can recognise the limits of their domain competence and adjust to domains outside their subject area. The students are able to recognise missing (own) competences and to supplement them with complementary competences (of other persons in the team). Students can communicate their domain to others and develop a basic understanding of foreign domains.
- Value-based action: Students can use selected tools of psychology to recognize their own values. They can compare these values with other team members and critically reflect on whether their offers match these values.

Social competence

- Ability to cooperate: Students can analyse and assess their cooperation behaviour in the group.
- Communication skills: Students can present their information in a convincing, focused and target group-oriented way.
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- Dealing with risks: Students can identify the basic risks in terms of desirability, technical feasibility and profitability. Students can use customer interaction methods to test desirability and willingness to pay. Students can draw up a rudimentary competitive analysis. Students can identify and identify risks and possible reactions.

Systemic technical competence

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- Validation in a volatile environment: Students can perform a technical and economic validation under volatile boundary conditions. For this purpose they can name the boundary conditions and interpret the results of the validation.
- Functional decomposition: Students are able to identify and interpret complex customer needs and derive functional requirements from them.
- Architecture development: The students are able to recognize correlations from the functional requirements and to derive a suitable system architecture.

Prerequisites

The module can only be completed together with the module M-WIWI-105010 "Student Innovation Lab (SIL) 1".

An application is required for participation in the modules Student Innovation Lab (SIL) 1 and Student Innovation Lab (SIL) 2. Information about the application can be found at http://www.kit-student-innovation-lab.de/index.php/for-students/.
Content
In a real laboratory, the module imparts professional, social and personal competences in entrepreneurship and in the respective technical domain. The aim is to prepare students in the best possible way for an entrepreneurial activity within or outside an established organisation. Our teaching is research-based and practice-oriented.

As an integral part, the lecture Entrepreneurship offers the theoretical basis and gives an overview of important theoretical concepts and empirical evidence. Current case studies and practical experiences of successful founders underline the theoretical and empirical contents. In order to operate a company on a long-term basis, important specialist knowledge is also of decisive importance. The content of the lecture therefore includes an introduction to Entrepreneurial Marketing and Leadership as well as the basics of Opportunity Recognition and Business Modeling. Customer-centric development methods, the lean start-up approach and methods for technology-oriented innovation are presented. Future founders must be able to develop and manage resources such as financial and human capital, infrastructure and intellectual property. Further aspects relate to the establishment of an organisation and the financing of one’s own project.

The knowledge gained in the lecture Entrepreneurship will be applied in a practice-oriented seminar and in the labs. We use an action learning approach to complement the knowledge with skills and reflective attitudes. In five-member teams, the students experience their way from idea generation to the final investor pitch.

With regard to the labs, students have the following options:

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The module also teaches methods of agile system development (Scrum) and the associated validation methods as well as methods of functional prototyping. Gate plans are applied within the module to determine project progress.

Methods for the reflection of individual & team work are treated and applied as well as group work specific knowledge about different roles of team members, solution of conflict situations and interdisciplinary teams are obtained.

Annotation

Workload
The module comprises a total of 270 hours (8 hours attendance time, 213 hours preparation and follow-up time, 49 hours preparation time for examination), which corresponds to a total of 9 credit points for two semesters.
Module: Technical Logistics [M-MACH-101279]

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

**Organisation:** KIT Department of Mechanical Engineering

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

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**Mandatory**

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<td>T-MACH-109919</td>
<td>Basics of Technical Logistics I</td>
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<td>Mittwollen, Oellerich</td>
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<tr>
<td>T-MACH-109920</td>
<td>Basics of Technical Logistics II</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 requirement of credits of this module. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

T-MACH-109920 "Basics of Technical Logistics II" is based on T-MACH-109919 "Basics of Technical Logistics I". The contents are taught one after the other in one course in the winter semester. The individual exams are taken on one day at the end of the semester.

**Competence Goal**

The student

- acquires well-founded knowledge on the main topics of technical logistics
- gets an overview of different applications of technical logistics in practice,
- acquires expertise and understanding about functionality of material handling systems.

**Prerequisites**

none

**Content**

The module Technical Logistics provides in-depth basics on the main topics of technical logistics. The module focuses on technical characteristics of material handling technology. To gain a deeper understanding, the course is accompanied by exercises.

**Workload**

270 hours

**Learning type**

Lecture

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

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

**Part of:** Economics

Compulsory Elective Modules (Economics)

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**Election block: Compulsory Elective Courses (2 items)**

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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 major infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs.

Through its combination of lectures the module reflects the complex interdependencies between infrastructure policy, transport industry and regional policy and provides its participants with a comprehensive understanding of the functionalities of one of the most important sectors of the economy and its relevance for economic policy.

**Annotation**

The courses Assessment of Public Policies and Projects I (winter term) and Assessment of Public Policies and Projects II (summer term) will no longer be part of this module. Student who have already had exams in this courses can integrate these exams in this module.

**Workload**

The total workload for this module is approximately 270 hours. For further information see the 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 (Engineering Sciences)**

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**Election block: Compulsory Examination (between 2 and 3 items as well as between 6 and 9 credits)**

- T-BGU-101797 Methods and Models in Transportation Planning 3 CR Vortisch
- T-BGU-101798 Traffic Engineering 3 CR Vortisch
- T-BGU-101799 Traffic Management and Transport Telematics 3 CR Vortisch
- T-BGU-101800 Traffic Flow Simulation 3 CR Vortisch

**Election block: Electives (at most 1 item as well as between 0 and 3 credits)**

- T-BGU-100010 Transportation Data Analysis 3 CR Kagerbauer
- T-BGU-106611 Freight Transport 3 CR Chlond
- T-BGU-106301 Long-Distance and Air Traffic 3 CR Chlond
- T-BGU-101005 Tendering, Planning and Financing in Public Transport 3 CR Vortisch
- T-BGU-100014 Seminar in Transportation 3 CR Chlond, Vortisch
- T-WIWI-103174 Seminar Mobility Services (Master) 3 CR Satzger, Stryja
- T-BGU-103425 Mobility Services and new Forms of Mobility 3 CR Kagerbauer
- T-BGU-103426 Strategic Transport Planning 3 CR Waßmuth
- T-BGU-106608 Information Management for Public Mobility Services 3 CR Vortisch

**Competence Goal**
See German version.

**Prerequisites**
None

**Recommendation**
None
### 6.110 Module: Urban Water Technologies [M-BGU-104448]

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

<table>
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**Mandatory**

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<tr>
<td>T-BGU-106600</td>
<td>Urban Water Infrastructure and Management</td>
<td>6 CR</td>
<td>Fuchs</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</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 (Engineering Sciences)

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

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<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I</td>
<td>3</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I</td>
<td>1.5</td>
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<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II</td>
<td>1.5</td>
<td>CR</td>
<td>Weber</td>
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<tr>
<td>T-MACH-102207</td>
<td>Tires and Wheel Development for Passenger Cars</td>
<td>3</td>
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<td>T-MACH-105162</td>
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<td>T-MACH-102156</td>
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<td>Simulation of Coupled Systems - Advance</td>
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<td>Gear Cutting Technology</td>
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**Competence Certificate**

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

**Competence Goal**

The student
- knows and understands the procedures in automobile development,
- knows and understands the technical specifications at the development procedures,
- is aware of notable boundaries like legislation.

**Prerequisites**

None

**Content**

By taking the module Vehicle Development the students get to know the methods and processes applied in the automobile industry. They learn the technical particularities which have to be considered during the vehicle development and it is shown how the numerous single components cooperate in a harmoniously balanced complete vehicle. There is also paid attention on special boundary conditions like legal requirements.

**Recommendation**

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

**Workload**

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

**Learning type**

The teaching and learning procedures (lecture, lab course, workshop) are described for each course of the module separately.
### 6.112 Module: Virtual Engineering A [M-MACH-101283]

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

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

<table>
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<td>Virtual Engineering I</td>
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**Election block: Virtual Engineering A (at least 5 credits)**

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<th>Credits</th>
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<tr>
<td>T-MACH-109933</td>
<td>Business Administration for Engineers and IT professionals</td>
<td>4 CR</td>
<td>Sebregandi</td>
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<tr>
<td>T-MACH-102185</td>
<td>CATIA CAD Training Course</td>
<td>2 CR</td>
<td>Ovtcharova</td>
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<tr>
<td>T-MACH-105312</td>
<td>CATIA Advanced</td>
<td>4 CR</td>
<td>Ovtcharova</td>
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<tr>
<td>T-MACH-108491</td>
<td>Digitalization of Products, Services &amp; Production</td>
<td>4 CR</td>
<td>Pätzold</td>
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<td>T-MACH-102209</td>
<td>Information Engineering</td>
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<td>IoT Platform for Engineering</td>
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<tr>
<td>T-MACH-102181</td>
<td>PLM for Product Development in Mechatronics</td>
<td>4 CR</td>
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<td>Virtual Engineering Lab</td>
<td>4 CR</td>
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<tr>
<td>T-MACH-106741</td>
<td>Virtual Training Factory 4.X</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), 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
Module: Virtual Engineering B [M-MACH-101281]

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

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

<table>
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Mandatory

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<tr>
<td>T-MACH-102124</td>
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Elective block: Virtual Engineering B (at least 5 credits)

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<tr>
<td>T-MACH-109933</td>
<td>Business Administration for Engineers and IT professionals</td>
<td>4 CR</td>
<td>Sebregondi</td>
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<td>T-MACH-102185</td>
<td>CATIA CAD Training Course</td>
<td>2 CR</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>
<td>4 CR</td>
<td>Pätzold</td>
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<td>Virtual Training Factory 4.X</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.
6.114 Module: Water Chemistry and Water Technology I [M-CIWVT-101121]

**Responsible:** Prof. Dr. Harald Horn

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

**Part of:** Engineering Sciences

**Compulsory Elective Modules (Engineering Sciences)**

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<td>T-CIWVT-103351</td>
<td>Laboratory Work Water Chemistry</td>
<td>4 CR</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.
6.115 Module: Water Chemistry and Water Technology II [M-CIWVT-101122]

Responsible: Prof. Dr. Harald Horn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Engineering Sciences
Compulsory Elective Modules (Engineering Sciences)

<table>
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Mandatory

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

Competence Goal
The student
- has knowledge of types and sum of the water constituents and their interaction with each other and with the water molecules,
- knows and understands the basics of water chemistry and the most important methods for the treatment of different types of raw water.
- knows about the different types of water treatment and water purification methods to convert, reduce or concentrate water constituents,

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

Content
The effects of the different treatment and purification methods are shown and it is explained how they can convert, reduce or concentrate water constituents.
7 Courses

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

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

<table>
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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.

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

Negotiating Open Innovation
2545105, SS 2020, 2 SWS, Language: German, Open in study portal

Content
In times of great challenges, it is no longer sufficient for individual experts to be responsible for innovation success. This is precisely why there is currently so much hype surrounding the topic of Open Innovation. The exchange of knowledge within and between organizations is crucial, but requires the right attitudes and decisions. This seminar examines how this can be achieved in the best possible way, depending on the objectives. By visiting two practitioners from science-economics cooperations and the company’s own Startup Accelerator Programme, theory and practice are linked. Furthermore, a simulation game will take place in the last session, in which the learned will be applied. The grading is based on a group seminar work, which requires an empirical analysis and the preparation of this in the course of the semester (expose, preparation of the methodology) as well as well-informed participation.
Course: Advanced Empirical Asset Pricing [T-WIWI-110513]

**Responsibility:** Jun.-Prof. Dr. Julian Thimme

**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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<th>Recurrence</th>
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<td>Advanced Empirical Asset Pricing</td>
<td>2 SWS</td>
<td>Each winter term</td>
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<td>WS 20/21</td>
<td>2530602</td>
<td>Übung zu Advanced Empirical Asset Pricing</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Thimme</td>
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</table>

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### Competence Certificate

The success control takes place in form of a written examination (60 min) during the semester break (according to §4(2), 1 SPO). If the number of participants is low, an oral examination (according to §4(2), 2 SPO) may also be offered. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

### Recommendation

We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course. In addition, prior participation in the Asset Pricing Master course is strongly recommended.

### Annotation

New course from winter semester 2019/2020.

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

---

### Advanced Empirical Asset Pricing

2530601, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

---

### Content

In this course we will discuss the fundamentals of Asset Pricing and how to test them. Although this is an Empirical Asset Pricing course, we deal with some concepts from Asset Pricing Theory that we can test afterwards (CAPM, ICAPM, CCAPM, recursive utility). Besides, the course will cover the most important empirical methods to do so. For that purpose, we will discuss the overarching tool Generalized Method of Moments, and the special cases of OLS and FMB regressions. Every second week, we will meet for a programing session, in which we will look at the data to draw our own conclusions. An introduction to the software MATLAB will be given at the beginning of the course. Students should bring a laptop to these sessions. Programing skills are not required but helpful.

We start with a review of the Stochastic Discount Factor, which is already known from the course „Asset Pricing“. We then derive the CAPM and the Consumption-CAPM as special cases from the general consumption-savings optimization problem of the rational investor. In the first part of the course we discuss the CAPM and, as natural extensions, models with multiple factors. Prominent phenomena such as the value premium and momentum are discussed. In the second part of the lecture we will study extensions of Consumption-CAPM and study the implications of exotic preferences.

### Literature

**Basisliteratur**


**Zur Vertiefung/Wiederholung**

7 COURSES  

Course: Advanced Game Theory [T-WIWI-102861]

7.3 Course: Advanced Game Theory [T-WIWI-102861]

**Responsible:** Prof. Dr. Karl-Martin Ehrhart  
Prof. Dr. Clemens Puppe  
Prof. Dr. Johannes Philipp Reiß

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

**Part of:**  
M-WIWI-101453 - Applied Strategic Decisions  
M-WIWI-101500 - Microeconomic Theory  
M-WIWI-101502 - Economic Theory and its Application in Finance

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**Events**

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<td>Übung zu Advanced Game Theory</td>
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<td>Practice (Ü)</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). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

Basic knowledge of mathematics and statistics is assumed.

*Below you will find excerpts from events related to this course:*
7.4 Course: Advanced Lab Blockchain Hackathon (Master) [T-WIWI-111126]

**Responsible:** Prof. Dr. Ali Sunyaev

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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**Events**

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<td>2512403</td>
<td>Practical Course Blockchain Hackathon (Master)</td>
<td>SWS</td>
<td>Practical course (P)</td>
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</table>

**Prerequisites**

None

**Competence Certificate**

The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.
**7 COURSES**

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

**Responsible:** Professorenschaft des Fachbereichs Informatik

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

**Type**
Examination of another type

**Credits**
4,5

**Recurrence**
Each term

**Version**
1

**Events**

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<td>2512205</td>
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<td>Lab Automation in Everyday Life (Master)</td>
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<td>SS 2020</td>
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<td>Development of Sociotechnical Information Systems (Master)</td>
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<td>Praktikum Blockchain und Distributed Ledger Technology (Master)</td>
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<td>Practical lab Security, Usability and Society (Master)</td>
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**Competence Certificate**

The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

**Prerequisites**
None

**Annotation**

The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at https://portal.wiwi.kit.edu.

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

---

Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020
### Content

The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact. Registration information will be announced on the course page.

### Learning objectives:

- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

### Recommendations:

Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

### Workload:

The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.
Organizational issues
Anmeldung und weitere Informationen sind im WiWi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.

Practical lab Security, Usability and Society (Master)
2512555, SS 2020, 3 SWS, Language: English, Open in study portal

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

Important dates:
Kick-off: April 24th, 2020, 14:00-15:30 Microsoft Teams - please check the WiWi portal
Final submission: 8. September 2020, 23:59
Presentation: 28. September 2020, 14:00

Subjects:
Privacy-friendly apps
In this subject, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php. Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Topics:
- NoPhish 2.0
- Notes 2.0
- Sudoku 2.0

Programming Usable Security Intervention
In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, e.g. as an extension. Eg. TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Topics:
- Password Manager Enrollment Add-On
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- PassSec update
- TORPEDO - web service for different checks
- TORPEDO - Enabling to put identified phishing e-mails into the KIT-spam folder
- Privacy friendly and security friendly marketing analysis tool

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

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

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

This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php.

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

In any case, we will inform you promptly as soon as a more precise decision is reached.
Lab Realisation of innovative services (Master)
2512205, WS 20/21, 3 SWS, Language: German, Open in study portal

Content
As part of the lab, the participants should work together in small groups to realize innovative services (mainly for students). Further information can be found on the ILIAS page of the lab.

Organizational issues
Die genauen Termine und Informationen zur Anmeldung werden auf der Veranstaltungsseite bekannt gegeben.

Practical Course Cognitive Automobiles and Robots (Master)
2512501, WS 20/21, 3 SWS, Language: German/English, Open in study portal

Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:
- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:
Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:
The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im WiWi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.

Project lab Information Service Engineering (Master)
2512600, WS 20/21, 2 SWS, Language: English, Open in study portal
Content
The ISE project course is based on the summer semester lecture "Information Service Engineering". The topics of the ISE project course focus on artificial intelligence based applications. In particular, we are covering the following:

- Natural Language Processing
- Knowledge Graphs
- Deep Learning

Goal of the course is to work on a research problem in small groups (3-4 students) related to the ISE lecture topics, i.e. Natural Language Processing, Knowledge Graphs, and Machine Learning. The solution of the given research problem requires the development of a software implementation.

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

Required coursework includes:

- Mid term presentation (5-10 min)
- Final presentation (10-15 min)
- Course report (c. 20 pages)
- Participation and contribution of the students during the course
- Software development and delivery

Notes:
The ISE project course can also be credited as a seminar.

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

The project course will be restricted to 15 participants.

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

ISE Tutor Team:

- Dr. Mehwish Alam
- Dr. Danilo Dessi
- M. Sc. Genet Asefa Gesese
- M. Sc. Fabian Hoppe
- M. Sc. Zahra Rezaie
- M. Sc. Sasha Vsesviiatska
- B. Sc. Tabea Tietz

Organizational issues
Projektpraktikum Information Service Engineering can also be credited as a seminar.
Course: Advanced Lab Informatics (Master) [T-WIWI-110548]

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

Seminar Linked Data and the Semantic Web (Master)
2513313, WS 20/21, 2 SWS, Language: German/English, Open in study portal

Content
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.
7 COURSES

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

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

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Events

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Competence Certificate

The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites

None

Recommendation

Knowledge from the lecture "Information Security" is recommended.

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

V Practical Course Security (Master)

2512557, WS 20/21, 4 SWS, Language: German, Open in study portal

Practical course (P)

Content

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

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

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

Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

T

7.7 Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
              M-WIWI-101628 - Emphasis in Informatics
              M-WIWI-101630 - Electives in Informatics

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<td>3 SWS</td>
<td>Practical course (P)</td>
<td>Volkamer, Strufe, Mayer, Mossano</td>
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<td>3 SWS</td>
<td>Practical course (P)</td>
<td>Volkamer, Aldag, Düzgün, Mayer, Mossano, Reinheimer</td>
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<td>Practical Course Security, Usability and Society (Master)</td>
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<td>Volkamer, Aldag, Düzgün, Mayer, Mossano, Reinheimer</td>
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Competence Certificate
The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

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

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

Learning goals:
The student

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

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

Important dates:
Kick-off: April 24th, 2020, 14: 00-15: 30 Microsoft Teams - Please, check the WiWi portal
Final submission: 8. September 2020, 23:59
Presentation: 28. September 2020, 14:00

Subjects:
Privacy-friendly apps
In this subject, students complete an app (or an extension of an app) among our Privacy-Friendly Apps. Please click the following link to know more about them: https://secuso.aifb.kit.edu/english/105.php. Students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Topics:
- NoPhish 2.0
- Notes 2.0
- Sudoku 2.0

Programming Usable Security Intervention
In this subject, students develop a part of coding, an extension, or another programming task dealing with various usable security interventions, eg as an extension. Eg TORPEDO (https://secuso.aifb.kit.edu/english/TORPEDO.php) or PassSec + (https://secuso.aifb.kit.edu/english/PassSecPlus.php). Just as before, students are provided with a point list of goals, containing both basic features mandatory to pass the course and more advanced ones that heighten the final grade.

Topics:
- Password Manager Enrollment Add-On
- Portfolio Graphical Recognition-Based Passwords with Gamepads
- PassSec update
- TORPEDO - web service for different checks
- TORPEDO - Enabling to put identified phishing e-mails into the KIT-spam folder
- Privacy friendly and security friendly marketing analysis tool

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

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

Please, note that registration is not required to participate in the kick-off meeting.
This event counts towards the KASTEL certificate. Further information on how to obtain the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php.

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

In any case, we will inform you promptly as soon a more precise decision is reached.
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Content
Kick-off Meeting (compulsory attendance) on 18.10.2019 at 11:00 in room 3A-11.2
### 7.8 Course: Advanced Lab Sociotechnical Information Systems Development (Master) [T-WIWI-111125]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management

**Part of:**  
- M-WIWI-101472 - Informatics  
- M-WIWI-101628 - Emphasis in Informatics  
- M-WIWI-101630 - Electives in Informatics

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<td>Practical course (P)</td>
<td>Sunyaev, Pandl</td>
</tr>
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</table>

**Competence Certificate**

The alternative exam assessment consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

**Prerequisites**

None

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

**Practical Course Sociotechnical Information Systems Development (Master)**

2512401, WS 20/21, 3 SWS, Language: German/English, [Open in study portal](#)

**Content**

The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

**Learning objectives:**

- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

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

**Type**  
Examination of another type

**Credits**  
4,5

**Recurrence**  
Each summer term

**Version**  
2

**Competence Certificate**

The alternative exam assessment consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

**Prerequisites**

None
### 7.10 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>2540535</td>
<td><strong>Advanced Machine Learning</strong></td>
<td>2 SWS</td>
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<td></td>
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<td>Lecture (V) Nazemi</td>
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<td>SS 2020</td>
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<td><strong>Exercise Advanced Machine Learning</strong></td>
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<td>Practice (Ü) Nazemi</td>
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</table>

**Competence Certificate**  
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.  
A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**  
None

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

### Advanced Machine Learning  
2540535, SS 2020, 2 SWS, Language: English, Open in study portal  

Lecture (V)
Content
In recent years, the volume, variety, velocity, veracity, and variability of available data have increased due to improvements in computational and storage power. The rise of the Internet has made available large sets of data that allow us to use and merge them for different purposes. Data science helps us to extract knowledge from the continually-increasing large datasets. This course will introduce students to a wide range of machine learning and statistical techniques such as deep learning, LASSO, and support vector machine. You will get familiar with text mining, and the tools you need to analyze the various facets of data sets in practice. Students will learn theory and concepts with real data sets from different disciplines such as marketing, finance, and business.

Tentative Course Outline:
- Introduction
- Statistical Inference
- Shrinkage Methods
- Model Assessment and Selection
- Tree-based Machine Learning Algorithms
- Dimensionality Reduction
- Neural Networks and Deep Learning
- Natural Language Processing with Deep Learning
- Support Vector Machine

Time of attendance
- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m

The student will learn
- A wide range of machine learning algorithms and their weaknesses.
- The fundamental issues and challenges: data, high-dimension, train, model selection, etc.
- How to imply machine learning algorithms for real-world applications.
- The fundamentals of deep learning, main research activities, and on-going research in this field.

Literature
### 7.11 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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**Events**

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<td>WS 20/21</td>
<td>2579907</td>
<td>Advanced Management Accounting</td>
<td>4 SWS</td>
<td>Wouters, Riar</td>
</tr>
</tbody>
</table>

**Competence Certificate**

The assessment consists of an oral exam (30 min) (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None.

**Recommendation**

The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

**Annotation**

This course is held in English. Lectures and tutorials are integrated.

The course is compulsory and must be examined.

Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

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

**Advanced Management Accounting**

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<thead>
<tr>
<th>Code</th>
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<th>Description</th>
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<tbody>
<tr>
<td>2579907</td>
<td>WS 20/21</td>
<td>4 SWS, Language: English</td>
<td>Open in study portal</td>
<td>Lecture / Practice (VÜ)</td>
</tr>
</tbody>
</table>
Content
This course is held in English. Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

Inhalt:
- The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

Learning objectives:
- Students will be able to consider advanced management accounting methods in an interdisciplinary way and to apply these to managerial decision-making problems in operations and innovation.
- They will also be able to identify relevant research results on such methods.

Examination:
- The assessment consists of an oral exam (30 min) taking place in the recess period (according to § 4 (2) No. 2 of the examination regulation).
- The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Required prior Courses:
- The course is compulsory and must be examined.

Recommendations:
- The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Workload:
- The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature is mostly made available via ILIAS.
7.12 Course: Advanced Management Accounting 2 [T-WIWI-110179]

**Responsible:** Prof. Dr. Marcus Wouters

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

**Part of:** M-WIWI-101510 - Cross-Functional Management Accounting

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<th>Lecture / Practice (VÜ)</th>
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<td>2579908</td>
<td>Advanced Management Accounting 2</td>
<td>4 SWS</td>
<td>Wouters, Ebinger</td>
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**Competence Certificate**
The examination will no longer be offered as of summer semester 2021.

**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**
Lecture and examination will no longer be offered from summer semester 2021.

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

**Advanced Management Accounting 2**
2579908, SS 2020, 4 SWS, Language: English, [Open in study portal](#)

**Organizational issues**
Do 08:00 - 11:30 Uhr in Geb. 05.20 R 2A-19
**7.13 Course: Advanced Statistics [T-WIWI-103123]**

**Responsible:** Prof. Dr. Oliver Grothe  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101637 - Analytics and Statistics

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**Events**

|                |         |                                |         |                  |
|----------------|---------|---------------------------------|---------|
| WS 20/21       | 2550552 | Statistik für Fortgeschrittene  | 2 SWS   | Lecture (V)      |
| WS 20/21       | 2550553 | Übung zu Statistik für Fortgeschrittene | 2 SWS | Practice (Ü) Grothe, Kaplan |

**Competence Certificate**

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

**Prerequisites**

None

**Annotation**

New course starting winter term 2015/2016

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

**Statistik für Fortgeschrittene**

|                |         |                                |         |                  |
|----------------|---------|---------------------------------|---------|
| 2550552, WS 20/21, 2 SWS, Open in study portal | Lecture (V) |

**Literature**

Skript zur Vorlesung
### Course: Advanced Stochastic Optimization [T-WIWI-106548]

**Responsible:** Prof. Dr. Steffen Rebennack  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101473 - Mathematical Programming  
M-WIWI-103289 - Stochastic Optimization  

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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.
7.15 Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
         M-WIWI-101497 - Agglomeration and Innovation
         M-WIWI-101500 - Microeconomic Theory
         M-WIWI-101502 - Economic Theory and its Application in Finance

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Events

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<td>Lecture (V)</td>
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<td>SS 2020</td>
<td>Übung zu Advanced Topics in Economic Theory</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Pegorari</td>
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</table>

Competence Certificate
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

Prerequisites
None

Recommendation
This course is designed for advanced Master students with a strong interest in economic theory and mathematical models. Bachelor students who would like to participate are free to do so, but should be aware that the level is much more advanced than in other courses of their curriculum.

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

Advanced Topics in Economic Theory
2520527, SS 2020, 2 SWS, Language: English, Open in study portal

Literature
Die Veranstaltung wird in englischer Sprache angeboten:

The course is based on the excellent textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.
7.16 Course: Airport Logistics [T-MACH-105175]

Responsible: Dr.-Ing. André Richter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

Type: Oral examination
Credits: 3
Recurrence: Each winter term
Version: 2

Events
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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

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

**Airport logistics**
2117056, WS 20/21, 2 SWS, Language: German, [Open in study portal]

Content
Media
Presentations

Learning content
- Introduction
- Airport installations
- Luggage transport
- Passenger transport
- Security on the airport
- Legal bases of the air traffic
- Freight on the airport

Learning goals
The students are able to:
- Describe material handling and informations technology activities on airports,
- Evaluate processes and systems on airports as the law stands, and
- Choose appropriate processes and material handling systems for airports.

Recommendations
None

Workload
Regular attendance: 21 hours
Self-study: 99 hours

Note
Limited number of participants: allocation of places in sequence of registration (first come first served). Registration via "ILIAS" mandatory.
Personal presence during lectures mandatory.
Organizational issues

Literature
7.17 Course: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

Responsible: Dr.-Ing. Marcus Gohl
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101303 - Combustion Engines II

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<td></td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Gohl</td>
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</table>

Competence Certificate
Letter of attendance or oral exam (25 minutes, no auxiliary means)

Prerequisites
none

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

Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines
2134150, SS 2020, 2 SWS, Language: German, Open in study portal

Literature
Die Vorlesungsunterlagen werden vor jeder Veranstaltung an die Studenten verteilt.
7.18 Course: Analysis Tools for Combustion Diagnostics [T-MACH-105167]

**Responsible:** Jürgen Pfeil  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101303 - Combustion Engines II

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<td>Each summer term</td>
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**Events**

| SS 2020 | 2134134 | Analysis tools for combustion diagnostics | 2 SWS | Lecture (V) | Pfeil |

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

**Prerequisites**  
none

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

**Analysis tools for combustion diagnostics**  
2134134, SS 2020, 2 SWS, Language: German, Open in study portal

**Literature**  
Skript, erhältlich in der Vorlesung
7.19 Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]

**Responsible:** Dr. Daniela Beyer

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

**Part of:** M-WIWI-101507 - Innovation Management

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<td>Each winter term</td>
<td>1</td>
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**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management is recommended.

**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%).
Course: Application of Social Science Methods (WiWi) [T-GEISTSOZ-109052]

**Responsible:** Prof. Dr. Gerd Nollmann

**Organisation:** KIT Department of Humanities and Social Sciences

**Part of:** M-GEISTSOZ-101169 - Sociology

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</table>
7.21 Course: Applied Econometrics [T-WIWI-103125]

**Responsible:** Prof. Dr. Melanie Schienle

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

**Part of:** M-WIWI-101638 - Econometrics and Statistics I

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</table>

**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 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

### Type
Written examination

### Credits
4.5

### Recurrence
Each summer term

### Version
1

### Events

| SS 2020 | 2511032 | Applied Informatics - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services | 2 SWS | Lecture (V) | Sunyaev |
| SS 2020 | 2511033 | Übungen zu Angewandte Informatik - Internet Computing | 1 SWS | Practice (Ü) | Sunyaev |

### Competence Certificate
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

By successful processing the exercises a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

### Prerequisites
None

### Annotation
Replaces from winter semester 2019/2020 T-WIWI-109445 "Applied Informatics - Internet Computing".

Below you will find excerpts from events related to this course:
Content
The lecture Applied Computer Science II provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

Learning objectives:
The student learns about basic concepts and emerging technologies of distributed systems and internet computing. Practical topics will be deepened in lab classes.

Recommendations:
Knowledge of content of the module [WI1INFO].

Workload:
The total workload for this course is approximately 135-150 hours.

Literature
Wird in der Vorlesung bekannt gegeben
7.23 Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-101506 - Service Analytics
M-WIWI-103117 - Data Science: Data-Driven Information Systems

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Events

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<td>Artificial Intelligence in Service Systems</td>
<td>2 SWS</td>
<td>Kuhl, Vossing</td>
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</table>

Competence Certificate

The assessment consists of a written exam (60 min). Successful completion of the exercises is a prerequisite for admission to the written exam.

Prerequisites

None

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

Artificial Intelligence in Service Systems

2595650, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content

Artificial Intelligence (AI) 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-based solution. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. We then take this knowledge to the more complex case of service systems with different entities (e.g., companies) who interact with each other and show possibilities on how to derive holistic insights. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.

Students of this course will be able to understand and implement the complete lifecycle of a typical Artificial Intelligence use case with supervised machine learning. Furthermore, they understand the importance and the means of applying AI and Machine Learning within service systems, which allows multiple, independent entities to collaborate and derive insights. Students will be proficient with typical Python code for AI challenges.
7 COURSES

Course: Artificial Intelligence in Service Systems [T-WIWI-108715]

Literature

7.24 Course: Asset Pricing [T-WIWI-102647]

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

Organisation: KIT Department of Economics and Management

Part of:  
M-WIWI-101480 - Finance 3  
M-WIWI-101482 - Finance 1  
M-WIWI-101483 - Finance 2  
M-WIWI-101502 - Economic Theory and its Application in Finance

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Events

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<td>SS 2020 2530556</td>
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<td>1 SWS</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 up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites

None

Recommendation

We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

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

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

Literature

Basic literature


Zur Wiederholung/Vertiefung

7.25 Course: Auction Theory [T-WIWI-102613]

**Responsible:** Prof. Dr. Karl-Martin Ehrhart  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101446 - Market Engineering  
- M-WIWI-101453 - Applied Strategic Decisions  
- M-WIWI-101500 - Microeconomic Theory

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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 related to this course:

**Auktionstheorie**

2520408, WS 20/21, 2 SWS, [Open in study portal](#)

**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
7.26 Course: Automated Manufacturing Systems [T-MACH-102162]

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

Part of: M-MACH-101298 - Automated Manufacturing Systems

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Events

| SS 2020 | 2150904 | Automated Manufacturing Systems | 6 SWS | Lecture / Practice (VÜ) | Fleischer |

Competence Certificate
written exam (120 minutes)

Prerequisites
"T-MACH-108844 - Automatisierte Produktionsanlagen" must not be commenced.

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

Automated Manufacturing Systems
2150904, SS 2020, 6 SWS, Language: German, Open in study portal Lecture / Practice (VÜ)
Content
The lecture provides an overview of the structure and functioning of automated manufacturing systems. In the introduction chapter the basic elements for the realization of automated manufacturing systems are given. This includes:

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

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

Learning Outcomes:
The students ...

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

Workload:
MACH:
regular attendance: 63 hours
self-study: 177 hours

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

Organizational issues
Start: 21.04.2020
Vorlesungstermine dienstags 8.00 Uhr und donnerstags 8.00 Uhr, Übungstermine donnerstags 9.45 Uhr.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).
### Course: Automation of Discrete Event and Hybrid Systems [T-ETIT-100981]

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

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<td>Kluwe</td>
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**Prerequisites:** none
Course: Automotive Engineering I [T-MACH-102203]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

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Competence Certificate

Written examination

Duration: 120 minutes

Auxiliary means: none

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-MACH-100092 - Automotive Engineering I must not have been started.

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

Automotive Engineering I

2113809, WS 20/21, 4 SWS, Language: English, Open in study portal

Lecture (V)

Content

1. History and future of the automobile

2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety

3. Drive systems: combustion engine, hybrid and electric drive systems

4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)

5. Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:

The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues

Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.

Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.
**Literature**

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

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101266 - Automotive Engineering

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**Competence Certificate**  
Written examination

**Duration:** 120 minutes

**Auxiliary means:** none

**Prerequisites**  
The brick "T-MACH-102203 - Automotive Engineering I" is not started or finished. The bricks "T-MACH-100092 - Grundlagen der Fahrzeugtechnik I" and "T-MACH-102203 - Automotive Engineering I" can not be combined.

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

**Automotive Engineering I**  
2113805, WS 20/21, 4 SWS, Language: German, [Open in study portal]

**Content**

1. History and future of the automobile
2. Driving mechanics: driving resistances and driving performance, mechanics of longitudinal and lateral forces, active and passive safety
3. Drive systems: combustion engine, hybrid and electric drive systems
4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)
5. Power transmission and distribution: drive shafts, cardon joints, differentials

**Learning Objectives:**  
The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

**Organizational issues**  
Kann nicht mit der Veranstaltung [2113809] kombiniert werden.  
Can not be combined with lecture [2113809].
Literature

Automotive Engineering I
2113809, WS 20/21, 4 SWS, Language: English, Open in study portal

Content
1. History and future of the automobile
2. Driving mechanics: driving resistances and driving performances, mechanics of longitudinal and lateral forces, active and passive safety
3. Drive systems: combustion engine, hybrid and electric drive systems
4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)
5. Power transmission and distribution: drive shafts, cardon joints, differentials

Learning Objectives:
The students know the movements and the forces at the vehicle and are familiar with active and passive safety. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to evaluate, and to develop the complex system "vehicle".

Organizational issues
Kann nicht mit LV Grundlagen der Fahrzeugtechnik I [2113805] kombiniert werden.
Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Literature
### 7.30 Course: Automotive Engineering II [T-MACH-102117]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101266 - Automotive Engineering

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**Competence Certificate**

Written Examination

Duration: 90 minutes

**Auxiliary means:** none

**Prerequisites**

None

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

### Automotive Engineering II

**Type:** Lecture (V)

**Reg.:** 2114835, SS 2020, 2 SWS, Language: German, Open in study portal

**Content**

1. **Chassis:** Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. **Steering elements:** Manual steering, servo steering, steer by wire
3. **Brakes:** Disc brake, drum brake, comparison of designs

**Learning Objectives:**

The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle bodywork and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

**Organizational issues**

Kann nicht mit der Veranstaltung [2114855] kombiniert werden.

Can not be combined with lecture [2114855]

**Literature**

Automotive Engineering II
2114855, SS 2020, 2 SWS, Language: English, Open in study portal

Content

1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, comparison of the designs

Learning Objectives:
The students have an overview of the modules which are necessary for the tracking of a motor vehicle and the power transmission between vehicle and roadway. They have knowledge of different wheel suspensions, tyres, steering elements, and brakes. They know different design versions, functions and the influence on driving and braking behavior. They are able to correctly develop the appropriate components. They are ready to analyze, to evaluate, and to optimize the complex interaction of the different components under consideration of boundary conditions.

Literature

Elective literature:

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

**Responsible:**
- Gerd Gutekunst
- Prof. Dr. Berthold Wigger

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

**Part of:** M-WIWI-101511 - Advanced Topics in Public Finance

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**Competence Certificate**
The assessment consists of a written exam (90 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
None

**Recommendation**
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course “Öffentliche Einnahmen” beforehand.

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

**Basics of German Company Tax Law and Tax Planning**
2560134, WS 20/21, 3 SWS, Language: German, Open in study portal

**Content**

**Workload:**
The total workload for this course is approximately 135.0 hours. For further information see German version.
### Course: Basics of Mobile Working Machines [T-MACH-110959]

**Responsible:** Prof. Dr.-Ing. Marcus Geimer  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101267 - Mobile Machines

#### Events

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**Competence Certificate**  
The assessment consists of an oral exam (45 min).

**Prerequisites**  
None

**Annotation**  
**Content:**  
From the lecture Fluid Power only the hydrostatic topics are required, from the lecture Mobile Machines all topics:

- property of fluids,  
- pumps and motors,  
- valves,  
- hydraulic circuits,  
- presentation of the components used and the most important mobile working machines,  
- basics and structure of the machines  
- practical insights into the development and application of the machines

**Media:**  
- a set of slides for the lectures can be downloaded  
- a written script for the lecture Fluid Power  

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

#### Mobile Machines

2114073, SS 2020, 4 SWS, Language: German, [Open in study portal](#)  
Lecture (V)

**Content**  
- Introduction of the required components and machines  
- Basics of the structure of the whole system  
- Practical insight in the development techniques

**Knowledge in Fluid Power is required.**

**Recommendations:**  
It is recommended to attend the course Fluid Power Systems [2114093] beforehand.

- regular attendance: 42 hours  
- self-study: 184 hours
7.33 Course: Basics of Technical Logistics I [T-MACH-109919]

Responsibility: Dr.-Ing. Martin Mittwollen
Jan Oellerich

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101279 - Technical Logistics

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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 basics of technical mechanics preconditioned.

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

Basics of Technical Logistics

2117095, WS 20/21, 3 SWS, Language: German, Open in study portal

Lecture / Practice (VÜ)

Content

- effect model of conveyor machines
- elements for the change of position and orientation
- conveyor processes
- identification systems
- drives
- mechanical behaviour of conveyors
- structure and function of conveyor machines
- elements of intralogistics
- sample applications and calculations in addition to the lectures inside practical lectures

Students are able to:

- Describe processes and machines of technical logistics,
- Model the fundamental structures and the impacts of material handling machines with mathematical models,
- Refer to industrially used machines
- Model real machines applying knowledge from lessons and calculate their dimensions.
Organizational issues
Die Erfolgskontrolle erfolgt in Form einer mündlichen oder schriftlichen Prüfung (nach §4 (2), 1 bzw. 2SPO).
The assessment consists of an oral or a written exam according to Section 4 (2), 1 or 2 of the examination regulation.
Es wird Kenntnis der Grundlagen der Technischen Mechanik vorausgesetzt.
Basics knowledge of technical mechanics is preconditioned.

Ergänzungsblätter, Präsentationen, Tafel.
Supplementary sheets, presentations, blackboard.

Präsenz: 48 Std
Nacharbeit: 132 Std
presence: 48h
rework: 132h

Literature
Empfehlungen in der Vorlesung / Recommendations during lessons
7.34 Course: Basics of Technical Logistics II [T-MACH-109920]

**Responsible:** Maximilian Hochstein  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101279 - Technical Logistics

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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 basics of technical mechanics and out of "Basic of Technical Logistics I" (T-MACH-109919) preconditioned.
### 7.35 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 20/21</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tbody>
</table>

**Competence Certificate**  
written exam (75 Min.)

**Prerequisites**  
none

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

**BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I**  
2141864, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)  

**Literature**  
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005  
M. Madou  
Fundamentals of Microfabrication  
Taylor & Francis Ltd.; Auflage: 3. Auflage: 2011
7.36 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II
[T-MACH-100967]

**Responsible:** Prof. Dr. Andreas Guber

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101287 - Microsystem Technology
- M-MACH-101290 - BioMEMS

**Type:** Written examination

**Credits:** 3

**Recurrence:** Each summer term

**Version:** 2

**Events**

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<th>SS 2020</th>
<th>2142883</th>
<th>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Guber</th>
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</thead>
</table>

**Competence Certificate**

Written exam (75 Min.)

**Prerequisites**

none

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

**BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II**
2142883, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**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

**Organizational issues**
Die Vorlesung findet im Sommersemester aufgrund der aktuellen Situation bis auf Weiteres online statt. Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

Die Vorlesung wird voraussichtlich mit der Software ZOOM oder MS Teams zu den im Vorlesungsverzeichnis angekündigten Terminen (hier: Montag 11:30 - 13:00 Uhr) durchgeführt werden. Weitere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

**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
7.37 Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III
[T-MACH-100968]

Responsible: Prof. Dr. Andreas Guber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101287 - Microsystem Technology
M-MACH-101290 - BioMEMS

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Events

| Events  | SS 2020 | 2142879 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III | 2 SWS | Lecture (V) | Guber |

Competence Certificate
Written exam (75 Min.)

Prerequisites
none

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

Content
Examples of use in minimally invasive therapy
Minimally invasive surgery (MIS)
Endoscopic neurosurgery
Interventional cardiology
NOTES
OP-robots and Endosystems
License of Medical Products and Quality Management

Organizational issues
Die Vorlesung findet im Sommersemester aufgrund der aktuellen Situation bis auf Weiteres online statt. Zu jedem Vorlesungstermin werden via ILIAS die jeweiligen Folien im PDF-Format zur Verfügung gestellt.

Die Vorlesung wird voraussichtlich mit der Software ZOOM oder MS Teams zu den im Vorlesungsverzeichnis angekündigten Terminen (hier: Montag: 14:00 - 15:30 Uhr) durchgeführt werden. Weitere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

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

**Responsible:** apl. Prof. Dr. Hendrik Hölscher  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101287 - Microsystem Technology  
M-MACH-101290 - BioMEMS  
M-MACH-101294 - Nanotechnology  

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<td>Each summer term</td>
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**Events**  
| SS 2020  | 2142140 | Bionics for Engineers and Natural Scientists | 2 SWS | Lecture (V) | Hölscher, Greiner |

**Competence Certificate**  
written or oral exam  

**Prerequisites**  
none

_Below you will find excerpts from events related to this course:_

**Bionics for Engineers and Natural Scientists**  
2142140, SS 2020, 2 SWS, Language: German, [Open in study portal](#)  

**Content**  
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.  
The students should be able analyze, judge, plan and develop biomimetic strategies and products.  
Basic knowledge in physics and chemistry  
The successful attendance of the lecture is controlled by a written examination.

**Organizational issues**  
Die Vorlesung findet im Sommersemester 2020 aufgrund der aktuellen Situation ausschließlich online statt. Zu jedem Vorlesungstermin werden folgende Materialien via ILIAS zum Selbststudium zur Verfügung gestellt:

1. Alle Folien zur jeweiligen Vorlesung im PDF-Format  
2. Ausgewählte Folien/Themen als Video(s) mit Audiokommentar  
3. Übungsaufgaben deren Lösungen jeweils eine Woche später online gestellt werden  
4. Ausgewählte Originalartikel zu den Themen der jeweiligen Vorlesung

Zusätzlich gibt es jeweils zum geplanten Termin der Vorlesung ein Webinar (ca. 45 min.). Dies wird voraussichtlich mit der Software Zoom durchgeführt werden. Nähere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

**Literature**  
Folien und Literatur werden in ILIAS zur Verfügung gestellt.
7.39 Course: Bond Markets [T-WIWI-110995]

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

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

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

<table>
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**Events**

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<tr>
<th>Events</th>
<th>Code</th>
<th>Name</th>
<th>SWS</th>
<th>Lecture / Practice (VÜ)</th>
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<tbody>
<tr>
<td>WS 20/21</td>
<td>2530560</td>
<td>Bond Markets</td>
<td>3 SWS</td>
<td>Cölsch, Uhrig-Homburg</td>
<td></td>
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</tbody>
</table>

**Competence Certificate**
The assessment consists of a written exam (75min.) A bonus can be earned through successful participation in the tutorial sessions. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

**Annotation**
This course will be held in English.

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

| Bond Markets | 2530560, WS 20/21, 3 SWS, Language: English, Open in study portal | Lecture / Practice (VÜ) |

**Content**
The lecture "Bond Markets" deals with the national and international bond markets, which are an important source of financing for companies, as well as for the public sector. After an overview of the most important bond markets, different yield definitions are discussed. Based on this, the concept of the yield curve is presented. In addition, the theoretical and empirical relationships between ratings, default probabilities and spreads are analyzed. The focus will then be on questions regarding the valuation, measurement, management and control of credit risks.

The total workload for this course is approximately 135 hours (4.5 credits).

The assessment consists of a written exam (75min.) (according to §4(2), 1 SPO). A bonus can be earned through successful participation in the tutorial sessions. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Students deepen their knowledge of national and international bond markets. They gain knowledge of the traded instruments and their key figures for describing default risk such as ratings, default probabilities or credit spreads.

**Organizational issues**
Blockveranstaltung: Do 14:00-19:00 Uhr, Fr 9:45-17:15 Uhr
05./06.11., 19./20.11., 03./04.12.20
7.40 Course: Bond Markets - Models & Derivatives [T-WIWI-110997]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Events

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<td></td>
<td></td>
<td>(VÜ)</td>
<td></td>
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<tr>
<td></td>
<td>2530565</td>
<td>Grauer, Uhrig-Homburg</td>
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</table>

Competence Certificate
The assessment of success consists in equal parts of a written thesis and an oral exam including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.

Recommendation
Knowledge of “Bond Markets” and “Derivatives” courses is very helpful.

Annotation
This course will be held in English.

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

Bond Markets - Models & Derivatives
2530565, WS 20/21, 2 SWS, Language: English, Open in study portal

Content
- Competence Certificate: The assessment of success consists in equal parts of a written thesis and an oral exam (according to §4(2), 3 SPO) including a discussion of one's own work. The main examination is offered once a year, re-examinations every semester.
- Competence Goal: Students deepen their knowledge of national and international bond markets. They are able to apply the knowledge they have gained about traded instruments and common valuation models for pricing derivative financial instruments.
- Prerequisites:
- Content: The lecture “Bond Markets – Models & Derivatives” deepens the content of the lecture “Bond Markets”. The modelling of the dynamics of yield curves and the management of credit risks forms the theoretical foundation for the valuation of interest rate and credit derivatives to be discussed. In this course, students deal intensively with selected topics and acquire the relevant knowledge on their own.
- Recommendation: Knowledge of “Bond Markets” and “Derivatives” courses is very helpful.
- Workload: The total workload for this course is approximately 90 hours (3.0 credits).

Organizational issues
Blockveranstaltung
freitags 9:45-17:15 Uhr, 15.01. und 22.01.21
### 7.41 Course: Bond Markets - Tools & Applications [T-WIWI-110996]

**Responsible:** Prof. Dr. Marliese Uhrig-Homburg  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101480 - Finance 3  
- M-WIWI-101483 - Finance 2

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<td>2530562</td>
<td>Bond Markets - Tools &amp; Applications</td>
<td>1 SWS</td>
<td>Block (B)</td>
<td>Uhrig-Homburg, Grauer</td>
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</table>

**Competence Certificate**  
The assessment consists of an empirical case study with written elaboration and presentation. The main examination is offered once a year, re-examinations every semester.

**Recommendation**  
Knowledge of the “Bond Markets” course is very helpful.

**Annotation**  
This course will be held in English.

**Content**

- **Competence Certificate:** The assessment consists of an empirical case study with written elaboration and presentation (according to §4(2), 3 SPO). The main examination is offered once a year, re-examinations every semester.
- **Competence Goal:** The students apply various methods in practice within the framework of a project-related case study. They are able to deal with empirical data and analyze them in a targeted manner.
- **Content:** The course “Bond Markets - Tools & Applications” includes a hands-on project in the field of national and international bond markets. Using empirical datasets, the students have to apply practical methods in order to analyze the data in a targeted manner.
- **Recommendation:** Knowledge of the “Bond Markets” course is very helpful.
- **Workload:** The total workload for this course is approximately 45 hours (1.5 credits).

**Organizational issues**
Blockveranstaltung am 11.12.20, Zeiten nach gesondertem Aushang  
Seminarraum 320 Geb. 09.21
7.42 Course: Boosting of Combustion Engines [T-MACH-105649]

**Responsible:** Dr.-Ing. Johannes Kech  
Dr.-Ing. Heiko Kubach

**Organisation:** KIT Department of Mechanical Engineering

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

<table>
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**Type**  
Oral examination

**Competence Certificate**  
oral exam, 20 min

**Prerequisites**  
none
### 7.43 Course: Building Laws [T-BGU-103429]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101884 - Lean Management in Construction  
- M-BGU-101888 - Project Management in Construction

<table>
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<th>Credits</th>
<th>Lecture (V)</th>
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<th>Recommendation</th>
<th>Annotation</th>
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- **Type**: Oral examination  
- **Credits**: 3  
- **Recurrence**: Each summer term  
- **Version**: 1

Prerequisites  
None

Recommendation  
None

Annotation  
None
7.44 Course: BUS-Controls [T-MACH-102150]

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

**Part of:** M-MACH-101266 - Automotive Engineering

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<th>Recurrence</th>
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<td>BUS-Controls</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Geimer, Daiß, Metzger</td>
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</table>

**Competence Certificate**
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

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

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

The number of participants is limited. A registration in mandatory, the details will be announced on the webpages of the Institute of Vehicle System Technology / Institute of Mobile Machines. In case of too many applications, attendance will be granted based on pre-qualification.

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

After the practical oriented lessons the students will be able to visualize the communication structure of different applications, design basic systems and evaluate the complexity of programming of the complete system.

Hereunto the students program in the practical orientated lessons IFM-controllers using the programming environment CoDeSys.

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

**Literature:**

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

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

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

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

Literature

Weiterführende Literatur:

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

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101266 - Automotive Engineering

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<td>Each summer term</td>
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</table>

**Competence Certificate**
Creation of control program

**Prerequisites**
none
7.46 Course: Business Administration for Engineers and IT professionals [T-MACH-109933]

**Responsible:** Heinz-Peter Sebregondi  
**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>WS 20/21</td>
<td>Examination of another type</td>
<td>4</td>
<td>Each term</td>
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</table>

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

**Prerequisites**  
None

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

**Business Administration for Engineers and IT professionals**  
2122303, SS 2020, 2 SWS, Language: German/English, Open in study portal

**Content**  
Learning content

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

**Learning objectives**

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

**Organizational issues**  
Teilnehmerzahl ist auf 30 Personen begrenzt. / Number of participants limited to 30 people.

**Literature**

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

Erfolgsfaktoren für die nachhaltige Business-Karriere: Die menschliche und die Business-Perspektive; Heinz-Peter Sebregondi (Amazon 2018)
Business Administration for Engineers and IT professionals
2122303, WS 20/21, 2 SWS, Language: German/English, Open in study portal

Content
Learning content

- Competitive strategies, customer value, corporate cultures, lifecycles (technology, business, product), market leadership dynamics.
- Continuum commoditization/differentiation.
- Value chain, core and support functions.
- A company’s business portfolio.
- Profit margin sensitivity.
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- Sales, procurement/purchasing, negotiation strategies

Learning objectives

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

Organizational issues

Teilnehmerzahl ist auf 12 Personen begrenzt. / Number of participants limited to 12 people.

Literature

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

Erfolgsfaktoren für die nachhaltige Business-Karriere: Die menschliche und die Business-Perspektive; Heinz-Peter Sebregondi (Amazon 2018)
7.47 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

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<tbody>
<tr>
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<td>Each summer term</td>
<td>1</td>
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</table>

**Competence Certificate**  
The lecture is no longer offered.

**Prerequisites**  
None

**Recommendation**  
Basic knowledge from Operations Research (linear programming) and from decision theory are expected.
Course: Business Data Analytics: Application and Tools [T-WIWI-109863]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-103118 - Data Science: Data-Driven User Modeling

Type: Examination of another type
Credits: 4.5
Recurrence: Each summer term
Version: 2

Events

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<th>Code</th>
<th>Course Name</th>
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<tr>
<td>SS 2020</td>
<td>2540466</td>
<td>Business Data Analytics: Application and Tools</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Dann, Staudt, Haubner</td>
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<td>SS 2020</td>
<td>2540467</td>
<td>Exercise Business Data Analytics: Application and Tools</td>
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<td>Practice (Ü)</td>
<td>Jaquart</td>
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</table>

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

Prerequisites
None

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

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

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

Business Data Analytics: Application and Tools
2540466, SS 2020, 2 SWS, Language: German, Open in study portal
Below you will find excerpts from events related to this course:

### Content

With new methods for capturing and using different types of data and industry’s recognition that society’s use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making all add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense–making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications.

### Organizational issues

**Application/Registration**

Attendance will be limited to 20-25 participants. Application/registration is therefore preliminary. After the application deadline has passed, positions will be allocated, based on evaluation of the previous study records. Applications are accepted only through the Wiwi-Portal: [https://portal.wiwi.kit.edu/ys/3871](https://portal.wiwi.kit.edu/ys/3871)

**Anmeldung**

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

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

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<td>WS 20/21 2540532</td>
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<td>Practice (Ü)</td>
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**Type**
Written examination

**Credits**
4,5

**Recurrence**
Each winter term

**Competence Certificate**
Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**
None

**Recommendation**
None

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

**Business Dynamics**
2540531, WS 20/21, 2 SWS, Language: German, Open in study portal

**Organizational issues**
Blockveranstaltung freitags, samstags 8 - 17:15 Uhr

**Literature**
7.51 Course: Business Intelligence Systems [T-WIWI-105777]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101506 - Service Analytics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations

Type: Examination of another type
Credits: 4.5
Recurrence: Each winter term
Version: 2

Events

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<tr>
<td>WS 20/21</td>
<td>2540422</td>
<td>Business Intelligence Systems</td>
<td>3</td>
<td>Lecture (V)</td>
</tr>
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</table>

Competence Certificate

Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites

None

Recommendation

Basic knowledge on database systems is helpful.

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

**Business Intelligence Systems**

2540422, WS 20/21, 3 SWS, Language: English, Open in study portal

**Lecture (V)**

Content

In most modern enterprises, Business Intelligence & Analytics (BI&A) Systems represent a core enabler of decision-making in that they are supplying up-to-date and accurate information about all relevant aspects of a company’s planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance. Modern BI&A systems leverage beyond reporting and dashboards also advanced analytical functions. Thus, today they also play a major role in enabling data-driven products and services. The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of BI&A Systems from a managerial and technical perspective.

The course is complemented with an engineering capstone project, where students work in a team with real-world use cases and data in order to create running Business intelligence & Analytics system prototypes.

Learning objectives

- Understand the theoretical foundations of key Business Intelligence & Analytics concepts supporting decision-making
- Explore key capabilities of state-of-the-art Business Intelligence & Analytics Systems
- Learn how to successfully implement and run Business Intelligence & Analytics Systems from multiple perspectives, e.g. architecture, data management, consumption, analytics
- Get hands-on experience by working with Business Intelligence & Analytics Systems with real-world use cases and data

Prerequisites

This course is limited to a capacity of 50 places. The capacity limitation is due to the attractive format of the accompanying engineering capstone project. Strong analytic abilities and profound skills in SQL as well as Python and/or R are required. Students have to apply with their CV and transcript of records.
Literature

- Economist Intelligence Unit. 2015 "Big data evolution: Forging new corporate capabilities for the long term”

Further literature will be made available in the lecture.
7.52 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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<td>Lecture (V)</td>
<td>Peukert, Dann, Dorner</td>
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<td>2540457</td>
<td>Übungen zu Geschäftsmodelle im Internet: Planung und Umsetzung</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Peukert, Dann</td>
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</table>

**Competence Certificate**

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

Success is monitored through ongoing elaborations and presentations of tasks and a written exam (60 minutes) at the end of the lecture period. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

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

**Prerequisites**

None

**Recommendation**

None

**Annotation**

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

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

**Internet Business Models**

2540456, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Organizational issues**

Diese Veranstaltung findet im Sommersemester 2020 nicht statt (siehe Modulhandbuch)

**Literature**

Wird in der Vorlesung bekannt gegeben.
### Course: Business Planning [T-WIWI-102865]

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

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<td>Business Planning for Founders</td>
<td>S</td>
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<td>WS 20/21</td>
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<td>Business Planning for Founders (ENTECH)</td>
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**Competence Certificate**
Alternative exam assessment.

**Prerequisites**
None

**Recommendation**
None

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

**Business Planning for Founders**
2545007, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

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

**Business Planning for Founders (ENTECH)**
2545007, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

**Content**
The seminar introduces students to the basic concepts of business planning for entrepreneurs. On the one hand, this involves concepts for the concretisation of business ideas (business modelling, market potential assessment, resource planning, etc.) and on the other hand, the preparation of an implementable business plan (with or without VC financing). In the course of the seminar, the students are familiarized with methods of further developing patents and business ideas into a more concrete business plan and formulating them in a business plan.
## 7.54 Course: Business Planning for Founders - EUCOR [T-WIWI-110389]

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<th>Responsible:</th>
<th>Prof. Dr. Orestis Terzidis</th>
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**Competence Certificate**
Alternative exam assessment.

**Prerequisites**
The course can only be combined with the course "International Selling - EUCOR" to be completed. The course is a combination of 6 ECTS, 3 ECTS per part.
7.55 Course: Business Process Modelling [T-WIWI-102697]

**Responsible:** Prof. Dr. Andreas Oberweis

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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<td>Practice (Ü)</td>
<td>Oberweis, Schüler, Schreiber</td>
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</table>

**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**

None

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

**Business Process Modelling**

2511210, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Content**

The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

**Learning objectives:**

Students

- describe goals of business process modeling and apply different modeling languages,
- choose the appropriate modeling language according to a given context,
- use suitable tools for modeling business processes,
- apply methods for analysing and assessing process models to evaluate specific quality characteristics of the process model.

**Recommendations:**

Knowledge of course Applied Informatics I - Modelling is expected.

**Workload:**

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


Weitere Literatur wird in der Vorlesung bekannt gegeben.
7.56 Course: Business Strategies of Banks [T-WIWI-102626]

**Responsible:** Prof. Dr. Wolfgang Müller

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

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

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<td>Business Strategies of Banks</td>
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<td>Lecture (V)</td>
<td>Müller</td>
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</table>

**Competence Certificate**

See German version.

**Prerequisites**

None

**Recommendation**

None

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

**Business Strategies of Banks**

2530299, WS 20/21, 2 SWS, Language: German, Open in study portal

**Lecture (V)**

**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.

**Learning outcomes:**

Students are are in a position to discuss the principles of commercial banking. They are familiar with fundamental concepts of bank management and are able to apply them.

**Workload:**

The total workload for this course is approximately 90 hours. For further information see the German version.

**Literature**

Weiterführende Literatur:

- Ein Skript wird im Verlauf der Veranstaltung kapitelweise ausgeteilt.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2014, Bankbetriebslehre, 6. Auflage, Springer
7.57 Course: Case Studies in Sales and Pricing [T-WIWI-102834]

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

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**Competence Certificate**

**Prerequisites**
None

**Recommendation**
None

**Annotation**
Please note that the workshop "Case Studies in Sales and Pricing" as well as all other 1.5-ECTS courses will not take place in the winter term 20/21 due to a research semester. The course will probably be offered again starting in WS21/22. Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed. For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu). Please note that only one of the 1.5-ECTS courses can be attended in this module.
course: Case Studies Seminar: Innovation Management [T-WIWI-102852]

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

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

**Part of:**
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovation Management

**Type:** Examination of another type

**Credits:** 3

**Recurrence:** Each winter term

**Version:** 1

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**Competence Certificate**
Alternative exam assessments (§4(2), 3 SPO).

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management is recommended.

---

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

**Case studies seminar: Innovation management**
2545105, WS 20/21, 2 SWS, Language: German, Open in study portal

**Content**
The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the automotive industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course. A short introduction to presentation techniques is planned to help students prepare the seminar papers.

**Literature**
Werden in der ersten Veranstaltung bekannt gegeben.
7.59 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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Events

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<tbody>
<tr>
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<td>CATIA advanced</td>
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<td>Ovtcharova, Mitarbeiter</td>
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<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 related to this course:

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

Content
In this design project, students develop a product in small groups according to an agile approach using the 3DEXPERIENCE platform (CATIA V6) from Dassault Systèmes. The extended functionalities of the platform are addressed and model-based work is carried out.

The development process is traced from the idea to the finished model. The main focus is on independent solution finding, teamwork, function fulfillment, production and design. The project results are presented at the end of the semester.

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Keine / None

Advanced CATIA
2123380, WS 20/21, 3 SWS, Language: German/English, Open in study portal

Content
In this design project, students develop a product in small groups according to an agile approach using the 3DEXPERIENCE platform (CATIA V6) from Dassault Systèmes. The extended functionalities of the platform are addressed and model-based work is carried out.

The development process is traced from the idea to the finished model. The main focus is on independent solution finding, teamwork, function fulfillment, production and design. The project results are presented at the end of the semester.

Organizational issues
Siehe ILIAS
Literature
Keine / None
7.60 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

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<td>Completed coursework (practical)</td>
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<td>Each term</td>
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**Competence Certificate**  
Practical examination on CAD computer, duration: 60 min.

**Prerequisites**  
None

**Recommendation**  
Dealing with technical drawings is required.

**Annotation**  
For the practical course attendance is compulsory.

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

**CATIA CAD training course**  
2123358, SS 2020, 3 SWS, Language: German, [Open in study portal]

**Content**

- Basics of CATIA such as user interface, handling etc.  
- Production and processing of different model types  
- Production of basic geometries and parts  
- Generation of detailed drawings  
- Integration of partial solutions in modules  
- Working with constrains  
- Strength analysis with FEM  
- Kinematic simulation with DMU  
- Dealing with CATIA Knowledgeware

Students are able to:

- create their own 3D geometric models in the CAD system CATIA and generate drawings due to the created geometry  
- carry out FE-studies and kinematic simulations using the integrated CAE tools  
- use advanced, knowledge-based functionalities of CATIA to automate the creation of geometry and thus to ensure the reusability of the models.

**Organizational issues**

Das Praktikum wird mehrmals in der vorlesungsfreien Zeit als einwöchige Blockveranstaltung angeboten. Weitere Informationen siehe Homepage des Instituts.

**Literature**

Praktikumskript
**Content**

- Basics of CATIA such as user interface, handling etc.
- Production and processing of different model types
- Production of basic geometries and parts
- Generation of detailed drawings
- Integration of partial solutions in modules
- Working with constrains
- Strength analysis with FEM
- Kinematic simulation with DMU
- Dealing with CATIA Knowledgeware

**Students are able to:**

- create their own 3D geometric models in the CAD system CATIA and generate drawings due to the created geometry
- carry out FE-studies and kinematic simulations using the integrated CAE tools
- use advanced, knowledge-based functionalities of CATIA to automate the creation of geometry and thus to ensure the reusability of the models.

**Organizational issues**

Siehe ILIAS

**Literature**

Praktikumskript
7.61 Course: Ceramic Processing Technology [T-MACH-102182]

Responsible: Dr. Joachim Binder
Organisation: KIT Department of Mechanical Engineering

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

<table>
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<tr>
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Events

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<tbody>
<tr>
<td>SS 2020</td>
<td>2126730</td>
<td>Ceramics Processing</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
</tr>
</tbody>
</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 related to this course:

V<br>Ceramics Processing<br>2126730, SS 2020, 2 SWS, Language: German, [Open in study portal]<br>Lecture (V)

Literature
### 7.62 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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<td>3 SWS</td>
<td></td>
<td>Lecture (V)</td>
<td>Mohr</td>
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</table>

**Competence Certificate**  
The assessment consists of a written paper and an oral exam of ca. 30-40 min.

**Prerequisites**  
None

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

**Annotation**  
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

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

_Below you will find excerpts from events related to this course:_

**Challenges in Supply Chain Management**  
2550494, SS 2020, 3 SWS, Language: English, [Open in study portal](#)

**Content**  
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / "Internet of Everything in production", supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

**Organizational issues**  
Blockveranstaltung, Termine werden bekannt gegeben

**Literature**  
Wird in Abhängigkeit vom Thema in den Projektteams bekanntgegeben.
7.63 Course: Characteristics of Transportation Systems [T-BGU-106609]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

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

**Part of:** M-BGU-101064 - Fundamentals of Transportation

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<td>Each summer term</td>
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**Events**

| SS 2020 | 6232806 | Eigenschaften von Verkehrsmitteln | 2 SWS | Lecture (V) | Vortisch |

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
**7.64 Course: Combustion Engines I [T-MACH-102194]**

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

**Organisation:** KIT Department of Mechanical Engineering

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

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<td>Combustion Engines I</td>
<td>4</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 related to this course:*

**Combustion Engines I**  
2133113, WS 20/21, 4 SWS, Language: German, [Open in study portal](#)

**Content**  
Introduction, History, Concepts  
Working Principle and Applications  
Characteristic Parameters  
Engine Parts  
Drive Train  
Fuels  
Gasoline Engines  
Diesel Engines  
Exhaust Gas Aftertreatment
### 7.65 Course: Combustion Engines II [T-MACH-104609]

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

**Organisation:** KIT Department of Mechanical Engineering  

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

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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 related to this course:**

**Combustion Engines II**
2134151, SS 2020, 3 SWS, Language: German, Open in study portal
7 COURSES

Course: Communication Systems and Protocols [T-ETIT-101938]

7.66 Course: Communication Systems and Protocols [T-ETIT-101938]

Responsible: Dr.-Ing. Jens Becker
Prof. Dr.-Ing. Jürgen Becker

Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101295 - Optoelectronics and Optical Communication

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<td>SS 2020</td>
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<td>Tutorial for 2311616 Communication Systems and Protocols</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Nidhi</td>
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Prerequisites

none
### 7.67 Course: Competition in Networks [T-WIWI-100005]

**Responsible:** Prof. Dr. Kay Mitusch  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101406 - Network Economics

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<td>Each winter term</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.

**Annotation**  
Due to the research semester of Prof. Mitusch the course will not be offered in the winter semester 20/21. An examination will be offered in each semester.
### 7.68 Course: Computational Economics [T-WIWI-102680]

**Responsible:** Dr. rer. nat. Pradyumn Kumar Shukla

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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<td>Each winter term</td>
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**Events**

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<td>Computational Economics</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Shukla</td>
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<tr>
<td>WS 20/21</td>
<td>2590459</td>
<td>Excercises to Computational Economics</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Shukla</td>
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</tbody>
</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 related to this course:**

### Computational Economics

2590458, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Content**

Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

**Learning objectives:**

The student

- understands the methods of Computational Economics and applies them on practical issues,
- evaluates agent models considering bounded rational behaviour and learning algorithms,
- analyses agent models based on mathematical basics,
- knows the benefits and disadvantages of the different models and how to use them,
- examines and argues the results of a simulation with adequate statistical methods,
- is able to support the chosen solutions with arguments and can explain them.
Literature


Weiterführende Literatur:

### Competence Certificate

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

### Recommendation

Basic knowledge of capital market theory.

---

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

#### Computational Risk and Asset Management

2500015, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

### Content

The course covers several topics, among them:

- Pattern detection in price and return data in equity, interest rate, futures and option markets.
- Quantitative Portfolio Strategies
- Modeling Return Densities using tools from financial econometrics, data science and machine learning
- Valuation of equity, fixed-income, futures and options in a coherent framework to possibly exploit arbitrage opportunities
- Neural networks and Natural Language Processing
7.70 Course: Computer Aided Data Analysis [T-GEISTSOZ-104565]

**Responsible:** Prof. Dr. Gerd Nollmann

**Organisation:** KIT Department of Humanities and Social Sciences

**Part of:** M-GEISTSOZ-101169 - Sociology

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<tr>
<td>5011009</td>
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**Version:** 1

**Completed coursework:** 0
## 7.71 Course: Computer Contract Law [T-INFO-102036]

**Responsible:** Michael Bartsch  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101215 - Intellectual Property Law

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### Events

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<tr>
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<td>Lecture</td>
<td>Menk</td>
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</table>

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

### Content

The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software  
- Contracts in the field of IT employment law  
- IT projects and IT Outsourcing  
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldsrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

### Organizational issues

Die Veranstaltung findet im **WS 2020/2021** in Form eines **Online-Stream live** statt.

### Literature

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H. Beck, III. Aufl. 2004  
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H. Beck, II. Aufl. 2002  
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

### Weiterführende Literatur

Ergänzende Literatur wird in den Vorlesungsfolien angegeben.
**Course: Constitution and Properties of Protective Coatings [T-MACH-105150]**

**Responsible:** apl. Prof. Dr. Sven Ulrich  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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**Events**

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<tr>
<td>WS 20/21</td>
<td>2177601</td>
<td>Constitution and Properties of Protective Coatings</td>
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</table>

**Competence Certificate**

oral examination (about 30 min)

no tools or reference materials

**Prerequisites**
none

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

**Constitution and Properties of Protective Coatings**

2177601, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Content**
oral examination (about 30 min); no tools or reference materials

Teaching Content:

introduction and overview

case studies of surface modification

coating concepts

coating materials

methods of surface modification

coating methods

characterization methods

state of the art of industrial coating of tools and components

new developments of coating technology

regular attendance: 22 hours

self-study: 98 hours

Transfer of the basic knowledge of surface engineering, of the relations between constitution, properties and performance, of the manifold methods of modification, coating and characterization of surfaces.

**Recommendations:** none

**Literature**

Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed
7.73 Course: Constitution and Properties of Wearresistant Materials [T-MACH-102141]

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

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

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<td>Each summer term</td>
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**Events**

| SS 2020 | 2194643 | Constitution and Properties of Wear resistant materials | 2 SWS | Lecture (V) | Ulrich |

**Competence Certificate**

oral examination (about 30 min)

no tools or reference materials

**Prerequisites**

none

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

**Constitution and Properties of Wear resistant materials**

2194643, SS 2020, 2 SWS, Language: German, Open in study portal

**Content**

The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

Teaching Content:

introduction

materials and wear

unalloyed and alloyed tool steels

high speed steels

stellites and hard alloys

hard materials

hard metals

ceramic tool materials

superhard materials

new developments

regular attendance: 22 hours

self-study: 98 hours

Basic understanding of constitution of wear-resistant materials, of the relations between constitution, properties and performance, of principles of increasing of hardness and toughness of materials as well as of the characteristics of the various groups of wear-resistant materials.

Recommendations: none
Organizational issues
Aufgrund der aktuellen Situation findet die Blockveranstaltung online in folgendem Zeitraum statt:
27.07.-29.07.2020
Montag und Dienstag jeweils von 8:00-19:00 Uhr; Mittwoch von 15:45-19:00 Uhr
Ort: online per MS-Teams
Anmeldung verbindlich bis zum 23.07.2020 unter sven.ulrich@kit.edu.
Nach der Anmeldung wird Ihnen der Link zur Vorlesung per E-Mail mitgeteilt.

Literature
Schneider, J.: Schneidkeramik, Verlag moderne Industrie, Landsberg am Lech, 1995

Kopien der Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed
7.74 Course: Construction Equipment [T-BGU-101845]

- **Responsible:** Prof. Dr.-Ing. Sascha Gentes
- **Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences
- **Part of:** M-BGU-101110 - Process Engineering in Construction

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<td>Maschinentechnik</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 - Control Engineering II

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<td>WS 20/21</td>
<td>2303179</td>
<td>Control of Linear Multivariable Systems (Tutorial to 2303177)</td>
<td>1</td>
<td>Practice</td>
<td>Jané Soneira</td>
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</tbody>
</table>

Competence Certificate
Success is checked as part of a written overall test (120 minutes) of the course.

Prerequisites
none

Recommendation
For a deeper understanding, basic knowledge of system dynamics and control technology is absolutely necessary, as taught in the ETIT Bachelor module "System Dynamics and Control Technology" M-ETIT-102181.
### 7.76 Course: Control Technology [T-MACH-105185]

**Responsible:** Hon.-Prof. Dr. Christoph Gönnheimer  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101284 - Specialization in Production Engineering

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#### Events

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<th>2150683</th>
<th>Control Technology</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Gönnheimer</th>
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</table>

**Competence Certificate**  
Written Exam (60 min)

**Prerequisites**  
none

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

**Control Technology**  
2150683, SS 2020, 2 SWS, Language: German, [Open in study portal](#)  
Lecture (V)
Content
The lecture control technology gives an integral overview of available control components within the field of industrial production systems.
The first part of the lecture deals with the fundamentals of signal processing and with control peripherals in the form of sensors and actors which are used in production systems for the detection and manipulation of process states.
The second part handles with the function of electric control systems in the production environment. The main focus in this chapter is laid on programmable logic controls, computerized numerical controls and robot controls. Finally the course ends with the topic of cross-linking and decentralization with the help of bus systems.
The lecture is very practice-oriented and illustrated with numerous examples from different branches.

The following topics will be covered:

- Signal processing
- Control peripherals
- Programmable logic controls
- Numerical controls
- Controls for industrial robots
- Distributed control systems
- Field bus
- Trends in the area of control technology

Learning Outcomes:
The students ...

- are able to name the electrical controls which occur in the industrial environment and explain their function.
- can explain fundamental methods of signal processing. This involves in particular several coding methods, error protection methods and analog to digital conversion.
- are able to choose and to dimension control components, including sensors and actors, for an industrial application, particularly in the field of plant engineering and machine tools. Thereby, they can consider both, technical and economical issues.
- can describe the approach for projecting and writing software programs for a programmable logic control named Simatic S7 from Siemens. Thereby they can name several programming languages of the IEC 1131.

Workload:
regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 23.04.2020

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).
7.77 Course: Convex Analysis [T-WIWI-102856]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

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).
7.78 Course: Conveying Technology and Logistics [T-MACH-102135]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-WIWI-101808 - Seminar Module

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**Events**

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<td>Seminar (S)</td>
<td>Furmans, Pagani</td>
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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

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

**Fördertechnik und Logistiksysteme**
2119100, SS 2020, SWS, Open in study portal

**Content**
The goal of the seminar is to deal with different topics related to the materials handling and logistics. The students can work on the topic either alone or in a group work. At the end the results are presented and discussed with a final presentation. The prepare the work for the seminar an introductory event is scheduled at the beginning.

**Organizational issues**
Ort: Gebäude 50.38, Raum 0.22, Termine siehe homepage
7.79 Course: Copyright [T-INFO-101308]

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

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Copyright 2 SWS Lecture (V) Dreier
7.80 Course: Corporate Compliance [T-INFO-101288]

Responsible: Andreas Herzig
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

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<td>Lecture (V)</td>
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<td>Herzig</td>
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</table>
7.81 Course: Corporate Financial Policy [T-WIWI-102622]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2
- M-WIWI-101502 - Economic Theory and its Application in Finance

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<td>Corporate Finance Policy</td>
<td>Ruckes</td>
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<td>2530215</td>
<td>Übungen zu Corporate Finance Policy</td>
<td>Ruckes, Hoang</td>
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<td>1 SWS</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 related to this course:

**Corporate Finance Policy**
2530214, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Literature**
**Weiterführende Literatur**
Course: Corporate Risk Management [T-WIWI-109050]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
        M-WIWI-101483 - Finance 2
        M-WIWI-101502 - Economic Theory and its Application in Finance

Competence Certificate
Please note that the lecture will not be offered in summer semester 2020.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

Prerequisites
None

Recommendation
None

Annotation
The course will exceptionally be held in the winter semester 2019/2020. Usually, however, the event takes place as a block course in the summer semester.
T 7.83 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 examination is offered for first-time writers for the last time in the winter semester 2020/21 and (only) for repeaters in the summer semester 2021.

The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The examination is offered every semester and can be repeated at every regular examination date.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
Knowledge from the course "Derivatives" is very helpful.

Annotation
The course will no longer be offered from winter semester 2020/21.
7.84 Course: Critical Information Infrastructures [T-WIWI-109248]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management

Part of:
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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<td>Critical Information Infrastructures</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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<tr>
<td>WS 20/21 2511401</td>
<td>Exercises to Critical Information Infrastructures</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>4</td>
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</table>

Competence Certificate
The alternative exam assessment consists of
- the preparation of a written elaboration as well as
- an oral examination as part of a presentation of the work.

Details of the grades will be announced at the beginning of the course.
The examination is only offered to first-time students in the winter semester, but can be repeated in the following summer semester.

Prerequisites
None.

Annotation

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

Critical Information Infrastructures
2511400, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)
Content
The course critical information infrastructures (CII) introduces students to the world of 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 course, critical information infrastructures will be introduced on a general level.

The following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. Students will work (in a group of 4) on a selected topic and have to write a course paper. Students can choose a topic from a variety of topics. To answer the research questions, students can use literature reviews but also interviews, surveys, programming tasks, and other research methods.

There will be a short introduction to the topics for the course paper in the following topic areas. In addition, it will be possible to propose your own topics as a group in the topic areas:

- Distributed Ledger Technology
- Internet of Things / Edge and Fog Computing
- Cloud Computing
- Health Information Infrastructures
- Information Privacy
- Certification of Critical IT-Services

Since we offer topics in this course that also correspond to the research interests in our research group, there may be the opportunity to work on the topics in more depth in the course of a final thesis.

Learning objectives:
Students know concepts and technologies relevant for the design and reliable operation of critical information infrastructures and can leverage them to develop solutions for real-world challenges.

Notes:
The number of participants is limited to 24 students. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/3853
The registration will be opened from September 1, 2020 until October 12, 2020.
Please make sure that you are available at the following dates if you want to take the course:

- 11.2020, 11:30 am–01:00 pm: 1. Foundations of Critical Information Infrastructures
- 11.2020, 11:30 am–01:00 pm: 2. Topic Area Presentation
- 11.2020, 11:30 am–01:00 pm: 3. Critical Information Infrastructure Landscape
- 11.2020, 11:30 am–01:00 pm: 4. Research on Information Systems & Group Assignment
- 12.2020, 10:00 am–04:00 pm: Interim Presentation
- 02.2021, 10:00 am–04:00 pm: Final Presentation

Further information on the course structure will be announced in the first session. Depending on the number of participants the individual sessions can have a shorter duration.

The meetings will take place online via MS Teams. We will provide a link to join the team if your registration was approved.

If you have any questions regarding course registration, please contact lins@kit.edu or dehling@kit.edu

Organizational issues
Bitte beachten Sie die geänderte Terminplanung. Die Vorlesung wird als Blockveranstaltung durchgeführt.

Literature
# 7.85 Course: Current Directions in Consumer Psychology [T-WIWI-111100]

**Responsible:** Prof. Dr. Benjamin Scheibehenne  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-105312 - Marketing and Sales Management

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<td>Once</td>
<td>1 terms</td>
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**Competence Certificate**  
Non exam assessment. Grading will be based on a continuous basis throughout the semester.

**Prerequisites**  
Strong Interest in Original Research.
7.86 Course: Current Issues in Innovation Management [T-WIWI-102873]

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

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

**Part of:**
- M-WIWI-101507 - Innovation Management
- M-WIWI-101507 - Innovation Management

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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.
7.87 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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**Events**

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<td>WS 20/21</td>
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<td>Seminar (S)</td>
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</table>

**Competence Certificate**

active participation and own presentation (30 Min.)

**Prerequisites**

none

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

### Actual topics of BioMEMS

2143873, SS 2020, 2 SWS, Language: German, [Open in study portal]

#### Content

- Short introduction to the basics of BioMEMS
- Selected aspects of biomedical engineering and life sciences
- Possible micro technical manufacturing processes
- Selected application examples from research and industry

The seminar includes (bio)medical engineering as well as biological and biotechnological topics in the context of engineering sciences

- Use of microtechnical components and systems in innovative medical products
- Use of microfluidic chip systems in applied biology and biotechnology

**Organizational issues**

Siehe Aushang

### Actual topics of BioMEMS

2143873, WS 20/21, 2 SWS, Language: German, [Open in study portal]

#### Organizational issues

Zeit: Siehe Aushang.

Ort: IMT Seminarraum, Campus Nord, Bau 301, Raum 405

Informationen und Anmeldemöglichkeit auch in der Vorlesung:

2141864 BioMEMS-Mikrosystemtechnik für Life-Sciences und Medizin; 1
7.88 Course: Data Mining and Applications [T-WIWI-103066]

Responsible: Rheza Nakhaeizadeh
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

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Events

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<th>2/4 SWS</th>
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</table>

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 related to this course:

**Data Mining and Applications**

2520375, SS 2020, 2/4 SWS, Language: German, [Open in study portal](#)

Lecture (V)

Content

**Learning objectives:**

Students

- know the definition of Data Mining
- are familiar with the CRISP-DM
- are familiar with the most important Data Mining Algorithms like Decision Tree, K-Means, Artificial Neural Networks, Association Rules, Regression Analysis
- will be able to use a DM-Tool

Content:

Part one: Data Mining:

What is Data Mining?; History of Data Mining; Conferences and Journals on Data Mining; Potential Applications; Data Mining Process; Business Understanding; Data Understanding; Data Preparation; Modeling; Evaluation; Deployment; Interdisciplinary aspects of Data Mining; Data Mining tasks: Data Mining Algorithms (Decision Trees, Association Rules, Regression, Clustering, Neural Networks); Fuzzy Mining; OLAP and Data Warehouse; Data Mining Tools; Trends in Data Mining

Part two: Examples of application of Data Mining

Success parameters of Data Mining Projects; Application in industry; Application in Commerce

Workload:

Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours
Exam preparation: 40 hours
Exam preparation: 40 hours

Organizational issues

Blockveranstaltung, Termine werden über ILIAS bekannt gegeben
Literature
U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, R. Uthurusamy, editors, Advances in Knowledge Discovery and Data Mining, AAAI/MIT Press, 1996 (order online from Amazon.com or from MIT Press).

Jiawei Han, Micheline Kamber, Data Mining: Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.

David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining, MIT Press, Fall 2000


7.89 Course: Data Protection by Design [T-INFO-108405]

**Responsible:** apl. Prof. Dr. Oliver Raabe

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101242 - Governance, Risk & Compliance

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7.90 Course: Data Protection Law [T-INFO-101303]

**Responsible:** Dr. Johannes Eichenhofer

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101217 - Public Business Law

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<td>Datenschutzrecht</td>
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7.91 Course: Database Systems and XML [T-WIWI-102661]

**Responsible:** Prof. Dr. Andreas Oberweis  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatics  
- M-WIWI-101628 - Emphasis in Informatics  
- M-WIWI-101630 - Electives in Informatics

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**Events**

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<td>2511203</td>
<td>Exercises Database Systems and XML</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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</table>

**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**

None

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

Database Systems and XML  
2511202, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**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 database systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

**Learning objectives:**

Students

- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

**Workload:**

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

- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Weitere Literatur wird in der Vorlesung bekannt gegeben.
7 COURSES

7.92 Course: Decentrally Controlled Intralogistic Systems [T-MACH-105230]

Responsible:
Prof. Dr.-Ing. Kai Furmans
Maximilian Hochstein

Organisation:
KIT Department of Mechanical Engineering

Part of:
M-MACH-104888 - Advanced Module Logistics

<table>
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<td>SS 2020</td>
<td>2117084</td>
<td>Decentrally controlled intralogistic systems</td>
<td>2</td>
<td>Practical course (P)</td>
<td>Furmans, Sperling, Ries, Hochstein</td>
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<td>WS 20/21</td>
<td>2117084</td>
<td>Decentrally controlled intralogistic systems</td>
<td>2</td>
<td>Practical course (P)</td>
<td>Furmans, Hochstein</td>
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</table>

Competence Certificate
Certificate by colloquium with presentation

Prerequisites
None

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

Decentrally controlled intralogistic systems
2117084, SS 2020, 2 SWS, Language: German, Open in study portal

Practical course (P)
Content

Requirements:
Duty of attendance

Recommendations:

Media:
Lego Mindstorms, PC

Teaching content:

- Introduction to intralogistic systems
- Development of a model of a decentralized logistics system
- Object-oriented programming of the control with LabView
- Implementation of the model in Mindstorms
- Presentation of work results

Note:

Limited number of participants (max. 15 students per group, under CORONA-conditions max. 8 students per group)
Selection is made according to a selection procedure
A passage in English language can be offered if required

Workload:
attendance time: 10 hours
Self-study: 80 hours (workstation is provided)

Educational goal:
The students can:

- Name and explain the basics of intralogistic conveyor systems
- Describe and explain communication types between decentralized systems
- Apply the basics of project management in subsequent projects
- Deal with the graphical based software development environment LabView
- Developing constructive solutions for mechanical problems
- Applying the theory learned to a practical problem
- Evaluate solutions developed through group discussions and presentations
- Examination:

Examination:
Certificate by colloquium with lecture and by fulfilling the attendance obligation

Organizational issues
Termine im WS2020/2021:
Gruppe 1 (Maximilian Ries) 22.02.2021 - 05.02.2021
Gruppe 2 (Marvin Sperling) 08.03.2021 - 19.03.2021

*Corona-bedingte Änderungen vorbehalten*

Literature
keine

Decentraly controlled intralogistic systems
2117084, VS 20/21, 2 SWS, Language: German, Open in study portal
Content
Proof:
- Certificate by colloquium with presentation

Note:
- Number of participants limited
- Participants will be selected
- One course during summer semester in english
- Compulsory attendance

Media:
- Lego Mindstorms, PC

Teaching content:
- Introduction to material handling systems
- Construction of a model for decentralized logistic systems
- Object-oriented programming with LabView
- Implementation of the model with Mindstorms
- Presentation of the results

Learning objectives:
Students are able to:
- Model complex cinematic systems and use object-oriented programming for this purpose,
- Build experimental setups in a team for decentralized controlled intralogistic systems, choose appropriate system components and models and finally proof the function by using experiments.

Effort:
- Regular attendance: 10 hours
- Self-study: 80 hours (workplace is provided)

Dates and further information see homepage

Literature
keine
7.93 Course: Demand-Driven Supply Chain Planning [T-WIWI-110971]

**Responsible:** Josef Packowski

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

**Part of:** M-WIWI-102805 - Service Operations

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**Competence Certificate**
The assessment consists of a written exam.

**Annotation**
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.
7.94 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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**Events**

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<td>Lecture (V)</td>
<td>Uhrig-Homburg, Thimme</td>
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<td>Practice (Ü)</td>
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**Competence Certificate**

The assessment takes place in the form of a written examination (75 minutes) according to §4(2), 1 SPO. The examination takes place during the semester break. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

**Prerequisites**

None

**Recommendation**

None

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

**Derivatives**

2530550, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Literature**


**Weiterführende Literatur:**

### 7.95 Course: Design Basics in Highway Engineering [T-BGU-106613]

**Responsible:** Prof. Dr.-Ing. Ralf Roos  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-100998 - Design, Construction, Operation and Maintenance of Highways

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#### Events

| SS 2020 | 6200408 | Design Basics in Highway Engineering | 2 SWS | Lecture (V) | Roos, Zimmermann |

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.96 Course: Design Thinking [T-WIWI-102866]

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

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

**Part of:** M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management

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<td>2545008</td>
<td>Design Thinking (Track 1)</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Terzidis, González, Abraham</td>
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<tr>
<td>WS 20/21</td>
<td>2545008</td>
<td>Design Thinking (Track 1)</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Abraham, Manthey, Terzidis</td>
</tr>
</tbody>
</table>

**Competence Certificate**

Alternative exam assessments (§4(2), 3 SPO).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The seminar content will be published on the website of the institute.

_Below you will find excerpts from events related to this course:_

**Design Thinking (Track 1)**

2545008, WS 20/21, 2 SWS, Language: German, Open in study portal

**Content**
Design Thinking is a user-centric innovation management method. The iterative process first analyzes the problem space and builds a sound understanding of the future users. Subsequently, ideas for the solution are generated, prototypes are created and tested by the user group. The result is a proven and validated product.

Learning goals:
During the seminar, the students learn basic procedures for achieving user-centric innovations. These are concrete methods that start with the potential user of certain products and services. The method is problem-oriented and emphasizes the specific customer situation. After attending the seminar, the students have a clear understanding of the need to explore end-user needs and are able to independently apply the methods of Design Thinking for developing market-driven innovations at a basic level.

**Credentials:**
Registration is via the Wiwi portal.

**ATTENTION:** Creditability in the seminar module: The seminar is NOT credited in the seminar module! Crediting is only possible in the EXPERT MODULE ENTREPRENEURSHIP.
7.97 Course: Designing Interactive Systems [T-WIWI-110851]

Responsible: Ulrich Gnewuch  
Prof. Dr. Alexander Mädche

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104068 - Information Systems in Organizations  
M-WIWI-104080 - Designing Interactive Information Systems

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Events  
SS 2020  
2540558  
Designing Interactive Systems  
3 SWS  
Lecture (V)  
Mädche, Gnewuch, Benke

Competence Certificate  
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites  
None

Annotation  
This course replaces T-WIWI-108461 "Interactive Information Systems" starting summer term 2020.  
The course is held in english.

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

Designing Interactive Systems  
2540558, SS 2020, 3 SWS, Language: English, Open in study portal  
Lecture (V)
Content Description
Computers have evolved from batch processors towards highly interactive systems. This offers new possibilities but also challenges for the successful design of the interaction between human and computer. Interactive systems are socio-technical systems in which users perform tasks by interacting with technology in a specific context in order to achieve specified goals and outcomes.

The aim of this course is to introduce advanced concepts and theories, interaction technologies as well as current practice of contemporary interactive systems.

The course is complemented with a design capstone project, where students in a team select and apply design methods & techniques in order to create an interactive prototype.

Learning objectives
- Get an advanced understanding of conceptual foundations of interactive systems from a human and computer perspective
- Explore the theoretical grounding of Interactive Systems leveraging theories from reference disciplines such as psychology
- Know specific design principles for the design of advanced interactive systems
- Get hands-on experience in conceptualizing and designing advanced Interactive Systems to solve a real-world challenge from an industry partner by applying the lecture contents.

Prerequisites
No specific prerequisites are required for the lecture.

Literature
Die Vorlesung basiert zu einem großen Teil auf

Weiterführende Literatur wird in der Vorlesung bereitgestellt.
### 7.98 Course: Developing Business Models for the Semantic Web [T-WIWI-102851]

<table>
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<th><strong>Responsible:</strong></th>
<th>Prof. Dr. York Sure-Vetter</th>
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<td><strong>Organisation:</strong></td>
<td>KIT Department of Economics and Management</td>
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<td><strong>Part of:</strong></td>
<td>M-WIWI-101488 - Entrepreneurship (EnTechnon)</td>
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</table>

**Competence Certificate**
Alternative exam assessments.

**Prerequisites**
None

**Recommendation**
As a recommendation to attending the seminar, basic knowledge about semantic technologies and concepts should be available. This may be acquired by attending one of the following lectures – Wissensmanagement, Semantic Web Technologies 1, Semantic Web Technologies 2 or by studying related literature. Furthermore the topic entrepreneurship should be of interest.
7.99 Course: Development of hybrid drivetrains [T-MACH-110817]

**Responsible:** Prof. Dr. Thomas Koch

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

| SS 2020 | 2134155 | Development of Hybrid Powertrains | 2 SWS | Lecture (V) | Koch, Doppelbauer |

**Competence Certificate**

written exam, 1 hour

**Prerequisites**

None

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

**Development of Hybrid Powertrains**

2134155, SS 2020, 2 SWS, Language: German, [Open in study portal]

**Content**

1. Introduction and Goal
2. Alternative Powertrains
3. Fundamentals of Hybrid Powertrains
4. Fundamentals of Electric Components of Hybrid Powertrains
5. Interactions in Hybrid Powertrain Development
6. Overall System Optimization
### 7.100 Course: Digital Health [T-WIWI-109246]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatics  
- M-WIWI-101628 - Emphasis in Informatics  
- M-WIWI-101630 - Electives in Informatics

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**Events**

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<td>WS 20/21</td>
<td>2511402</td>
<td>Digital Health</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Sunyaev, Thiebes, Schmidt-Kraepelin</td>
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**Competence Certificate**  
Alternative exam assessment (written elaboration, presentation, peer review, oral participation) according to §4(2),3 of the examination regulation. Details of the grading will be announced at the beginning of the course. The examination is only offered to first-time writers in the winter semester, but can be repeated in the following summer semester.

**Prerequisites**  
None.

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

**Digital Health**  
2511402, WS 20/21, 2 SWS, Language: German/English, [Open in study portal](#)  
Lecture (V)
Content
The master course Digital Health introduces master students to the subject of digitization in health care. Students will learn about the theoretical foundations and practical implications of various topics surrounding the digitization in health care, including health information systems, telematics, big health care data, and patient-centered health care.

After an introduction to the challenge of digitization in health care, the following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. Students will work (in a group of 3-4) on a selected topic and have to write a course paper. Students can choose a topic from a variety of topics. To answer the research questions, students can use literature reviews but also interviews, surveys, programming tasks, and other research methods are possible.

There will be a short introduction to the topics for the course paper in the following topic areas. In addition, it will be possible to propose your own topics as a group in the topic areas:

- Mobile Health (mHealth) / Gamification
- Distributed Ledger Technology / Blockchain
- Artificial Intelligence / Machine Learning
- Genomics / Biomedical Data

Since we offer topics in this course that also correspond to the research interests in our research group, there may be the opportunity to work on the topics in more depth in the course of a final thesis.

Learning objectives:
Students know about the challenges of digitization in health care and can leverage relevant concepts and technologies to address these challenges. Students learn to work in teams and critically discuss digital health topics with fellow students, researchers, and practitioners.

Notes:
The number of participants is limited to 24 students. Please register here: https://portal.wiwi.kit.edu/ys/3897
The registration will be opened from September 11, 2020 until October 12, 2020.
Please make sure that you are available at the following dates if you want to take the course:

- 11.2020, 15:45–17:15 - 1. Introduction to Digital Health
- 11.2020, 15:45–17:15 - 2. Topic Area Presentation #1
- 11.2020, 15:45–17:15 - 3. Topic Area Presentation #2
- 11.2020, 15:45–17:15 - 4. Topic Area Presentation #3
- 02.2021, 10:00–17:00 - Final Presentation

Further information on the course structure will be announced in the first session. Depending on the number of participants the individual sessions can have a shorter duration.

The meetings will take place online via MS Teams. We will provide a link to join the team if your registration was approved.

If you have any questions regarding course registration, please contact scott.thiebes@kit.edu or manuel.schmidt-kraepelin@kit.edu

Workload:
4,5 ECTS = approx. 135 hours.

Organizational issues
Bitte beachten Sie die geänderte Terminplanung und das geänderte Anmeldeverfahren (https://portal.wiwi.kit.edu/ys/3897)

**Responsible:** Anja Konhäuser

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

**Part of:** M-WIWI-105312 - Marketing and Sales Management

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<td>1.5</td>
<td>Each winter term</td>
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**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**

Please note that the workshop “Digital Marketing and Sales in B2B” as well as all other 1.5-ECTS courses will not take place in the winter term 20/21 due to a research semester. The course will probably be offered again starting in WS21/22. 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.
7 COURSES

Course: Digital Services: Business Models and Transformation [T-WIWI-110280]

7.102 Course: Digital Services: Business Models and Transformation [T-WIWI-110280]

**Responsible:** Prof. Dr. Gerhard Satzger

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

**Part of:**
- M-WIWI-101448 - Service Management
- M-WIWI-102754 - Service Economics and Management
- M-WIWI-102808 - Digital Service Systems in Industry

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**Events**

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**Competence Certificate**
The assessment of this course is a written examination (60 min.) (following §4(2), 1 SPOs) and by submitting written papers as part of the exercise.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
former name until winter semester 2019/2020: "Business and IT Service Management" (T-WIWI-102881)

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

**V Digital Services: Business Models and Transformation**
2595484, WS 20/21, 2 SWS, Language: English, [Open in study portal]

**Content**
Digitalization fuels the trends towards a service-led economy and drives the emergence of innovative digital services, but also new service-oriented offerings of existing enterprises ("servitization"). In particular, the use of new data resources (e.g., sensor-based data in the Internet of Things) and analytical methods open up ample opportunities for new data-driven services and associated novel business models.

In this lecture, we systematically build the theoretical and practical foundations on how to adapt, create and transform business models around digital services – using a top-down approach: The first part of the lecture is devoted to general service theory, management and transformation as a base for digital service businesses. The second and third part of the lecture then further zoom in into the specifics of digital service and data-based service business models and their transformation. Throughout the lecture, we put a particular focus on service systems – elevating the service and business model perspective from individual enterprises to larger “(eco-)systems” or “platforms”.

The lecture links theoretical content and current research to practical examples and exercises. Students are invited to actively engage in the discussion and contribute their knowledge. Invited guest speakers from industry as well as case studies ensure sufficient application orientation of this lecture.

**Note:** While the lecture builds upon aspects of the “Digital Service” lecture in the bachelor program, it is not mandatory for students to have participated in it.
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 - Innovation Management

**Type:** Examination of another type

**Credits:** 3

**Recurrence:** Each summer term

**Version:** 1

**Events**

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<td>2 SWS</td>
<td>Seminar (S)</td>
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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 is recommended.

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

**Digital Transformation and Business Models**

2545103, SS 2020, 2 SWS, Language: German, [Open in study portal]

**Content**

The seminar "Digital Transformation and Business Models" aims at the development of thematic aspects of digital transformation with simultaneous application of different business model methodologies. Established companies face the challenge of digital transformation. The digital transformation is particularly relevant for the business models of industrial enterprises. As part of innovation management, the examination of business model changes against the background of digital transformation is one of the main challenges facing the German economy. At the beginning, seminar topics will be assigned. These will be presented and discussed at the end of the seminar. In the first seminar date impulses to business model methodologies and the digital transformation take place, which are to be discussed then, in order to provide an understanding for the topic complex and to ensure the purposeful development of the seminar topics.
Course: Digitalization from Production to the Customer in the Optical Industry [T-MACH-110176]

**Responsible:** Marc Wawerla  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
- M-MACH-101284 - Specialization in Production Engineering  
- M-MACH-105455 - Strategic Design of Modern Production Systems

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**Events**

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<td>WS 20/21</td>
<td>2149701</td>
<td>Digitalization from Production to the Customer in the Optical Industry</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Wawerla</td>
</tr>
</tbody>
</table>

**Competence Certificate**  
Alternative test achievement (graded):  
- Processing and presentation (ca. 30 min) of a case study with weighting 50%  
- Written exam (ca. 60 min) with weighting 50%

**Prerequisites**  
none

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

**Digitalization from Production to the Customer in the Optical Industry**  
2149701, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)  
**Lecture (V)**

**Content**  
The lecture deals with Digitalization along the entire value chain end-to-end, with a focus on production and supply chain. Within this context, concepts, tools, methods, technologies and concrete applications in the industry are presented. Furthermore, the students get the opportunity to get first-hand insights into the digitalization journey of a German technology company.  
Main topics of the lecture:  
- Concepts and methods such as disruptive innovation and agile project management  
- Overview on technologies at disposal  
- Practical approaches in innovation  
- Applications in industry  
- Field trip to ZEISS

**Learning Outcomes:**  
The students ...  
- are capable to comment on the content covered by the lecture.  
- are able to analyze and evaluate the suitability of digitalization technologies in the optical industry.  
- are able to assess the applicability of methods such as disruptive innovation and agile project management.  
- are able to appreciate the practical challenges to digitalization in industry.

**Workload:**  
regular attendance: 21 hours  
self-study: 99 hours
Organizational issues
Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/studium-und-lehre.php)
Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.

For organisational reasons, the number of participants for the course is limited. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/studium-und-lehre.php).
Due to the limited number of participants, advance registration is required.
Course: Digitalization of Products, Services & Production [T-MACH-108491]

**Responsible:** Dr.-Ing. Bernd Pätzold

**Organisation:** KIT Department of Mechanical Engineering

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

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</table>

**Competence Certificate**

Assessment of another type. Two presentations in team work and two written compositions. Grading: each composition 1/6 and each presentation 2/3.

**Prerequisites**

none

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

### Digitalization of Products, Services & Production

2122310, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Seminar (S)**

**Content**

- Digitalization of products, services and production in the context of Industry 4.0.
- Key drivers for ongoing digitalization and their impact on future product development and manufacturing.
- Methods and procedures to design the according transformation process.
- Intensive group discussions of use-case scenarios using practical examples from the industry.

Students are able to

- describe the fundamental challenges and objectives of the progressive digitalization of products, service and production. In context of these challenges, students can name and explain the essential terms.
- illustrate the key drivers and fundamental technologies behind the digitalization of products, services and processes.
- describe the challenges of the ongoing digitalization and the corresponding changes in business processes and distinguish between them in regards to time and place. Furthermore, students are able to assign the IT-Architecture and systems to the corresponding process steps.
- highlight the requirement for future information management in networks of product development and production institutions and can clarify how to validated and safeguard the corresponding IT processes.
- to analyze the challenges of digitalization and present potential solution approaches via self-created scenarios for future developments.

**Organizational issues**

Siehe Homepage zur Lehrveranstaltung

**Literature**

Vorlesungsfolien / lecture slides

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Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020

309
7.106 Course: Disassembly Process Engineering [T-BGU-101850]

Responsible: Prof. Dr.-Ing. Sascha Gentes
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-101110 - Process Engineering in Construction

Type: Oral examination
Credits: 3
Recurrence: Each summer term
Version: 1

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<td>2 SWS</td>
<td>Lecture / Practice (VÜ)</td>
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Prerequisites
None

Recommendation
None

Annotation
None
7.107 Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

**Responsible:** Prof. Dr. Stefan Nickel

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

**Part of:**
- M-WIWI-102805 - Service Operations
- M-WIWI-102832 - Operations Research in Supply Chain Management

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

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<th>Ereignisdiskrete Simulation in Produktion und Logistik</th>
<th>3 SWS</th>
<th>Lecture (V)</th>
<th>Spieckermann</th>
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</table>

**Competence Certificate**
The assessment consists of a written paper and an oral exam of about 30-40 min (alternative exam assessment).

**Prerequisites**
None

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

**Annotation**
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course. The course is planned to be held every summer term.
The planned lectures and courses for the next three years are announced online.

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

**Ereignisdiskrete Simulation in Produktion und Logistik**
- **2550488**, SS 2020, 3 SWS, Language: German, [Open in study portal](#)

**Content**
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

**Literature**
### 7.108 Course: Dynamic Macroeconomics [T-WIWI-109194]

**Responsible:** Prof. Dr. Johannes Brumm  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101478 - Innovation and Growth  
- M-WIWI-101496 - Growth and Agglomeration  
- M-WIWI-101497 - Agglomeration and Innovation

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#### Events

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<td>Lecture (V)</td>
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<td>WS 20/21</td>
<td>2560403</td>
<td>Übung zu Dynamic Macroeconomics</td>
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<td>Practice (Ü)</td>
<td>Krause</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.

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

#### Dynamic Macroeconomics

2560402, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)  
Lecture (V)

**Literature**  
Literatur und Skripte werden in der Veranstaltung angegeben.
7.109 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 - Energy Economics and Technology

Type: Written examination  
Credits: 3.5  
Recurrence: Each summer term  
Version: 1  

Events

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<td>Each summer term</td>
<td>Written examination</td>
<td>Jochem, Fichtner</td>
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<td>2581006</td>
<td>Efficient Energy Systems and Electric Mobility</td>
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Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

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

Efficient Energy Systems and Electric Mobility

2581006, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)

Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

- Understand the concept of energy efficiency as applied to specific systems
- Obtain an overview of the current trends in energy efficiency
- Be able to determine and evaluate alternative methods of energy efficiency improvement
- Overview of technical and economical stylized facts on electric mobility
- Judging economical, ecological and social impacts through electric mobility

Literature
Wird in der Vorlesung bekanntgegeben.
7 COURSES

Course: eFinance: Information Systems for Securities Trading [T-WIWI-110797]

| Responsible: | Prof. Dr. Christof Weinhardt |
| Organisation: | KIT Department of Economics and Management |
| Part of: | M-WIWI-101446 - Market Engineering |
| | M-WIWI-101480 - Finance 3 |
| | M-WIWI-101483 - Finance 2 |

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Events

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<td>Weinhardt, Notheisen</td>
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<tr>
<td>WS 20/21</td>
<td>2540455</td>
<td>Übungen zu eFinance: Informationssysteme für den Wertpapierhandel</td>
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<td>Practice (Ü)</td>
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Competence Certificate
Success is monitored by means of ongoing elaborations and presentations of tasks and an examination (60 minutes) at the end of the lecture period. The scoring scheme for the overall evaluation will be announced at the beginning of the course.

Prerequisites
see below

Annotation
The course “eFinance: Information Systems for Securities Trading” covers different actors and their function in the securities industry in-depth, highlighting key trends in modern financial markets, such as Distributed Ledger Technology, Sustainable Finance, and Artificial Intelligence. Security prices evolve through a large number of bilateral trades, performed by market participants that have specific, well-regulated and institutionalized roles. Market microstructure is the subfield of financial economics that studies the price formation process. This process is significantly impacted by regulation and driven by technological innovation. Using the lens of theoretical economic models, this course reviews insights concerning the strategic trading behaviour of individual market participants, and models are brought market data. Analytical tools and empirical methods of market microstructure help to understand many puzzling phenomena in securities markets.

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

eFinance: Information Systems for Securities Trading
2540454, WS 20/21, 2 SWS, Language: English, Open in study portal

Content
The course “eFinance: Information Systems for Securities Trading” covers different actors and their function in the securities industry in-depth, highlighting key trends in modern financial markets, such as Distributed Ledger Technology, Sustainable Finance, and Artificial Intelligence. Security prices evolve through a large number of bilateral trades, performed by market participants that have specific, well-regulated and institutionalized roles. Market microstructure is the subfield of financial economics that studies the price formation process. This process is significantly impacted by regulation and driven by technological innovation. Using the lens of theoretical economic models, this course reviews insights concerning the strategic trading behaviour of individual market participants, and models are brought market data. Analytical tools and empirical methods of market microstructure help to understand many puzzling phenomena in securities markets.
Literature


Further Literature

7.111 Course: Electronics and EMC [T-ETIT-100723]

**Responsible:** Dr. Martin Sack

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

**Part of:** M-ETIT-101163 - High-Voltage Technology

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<th>Recurrence</th>
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<td>Electronics and EMC</td>
<td>Each summer term</td>
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Sack
7.112 Course: Elements and Systems of Technical Logistics [T-MACH-102159]

**Responsible:** Georg Fischer  
Dr.-Ing. Martin Mittwollen  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-104888 - Advanced Module Logistics

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<td>2117096</td>
<td>Elements and systems of Technical Logistics</td>
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</table>

**Competence Certificate**
The assessment consists of an oral exam (20min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**
none

**Recommendation**
Knowledge out of "Basics of Technical Logistics I" (T-MACH-109919) preconditioned.

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

**Elements and systems of Technical Logistics**  
2117096, WS 20/21, 3 SWS, Language: German, Open in study portal  
Lecture / Practice (VÜ)

**Content**

**Learning goals:**
Students are able to:

- Describe elements and systems of technical logistics,
- Model and calculate structures and functions of special conveying machines,
- Describe interdependence of material flow systems and technique quantitatively and qualitatively
- Equip material flow systems with appropriate machines.

**Content of teaching:**

- material flow systems and their (conveying) technical components  
- mechanical behaviour of conveyors;  
- structure and function of conveyor machines; elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)  
- sample applications and calculations in addition to the lectures inside practical lectures

**Presence:** 36h  
**Rework:** 84h  
**Annotations:**
- Knowledge out of Basics of Technical Logistics (LV 2117095) preconditioned.  
- The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.
**Organizational issues**
Die Erfolgskontrolle erfolgt in Form einer mündlichen (20min.) Prüfung (nach §4 (2), 2 SPO). Die Prüfung wird in jedem Semester angeboten und kann zu jedem ordentlichen Prüfungstermin wiederholt werden.
siehe auch Homepage / ILIAS

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 regulations.
look also at our homepage / ILIAS

**Literature**
Empfehlungen in der Vorlesung.
Recommendations during lectures.
Text is not visible in the image.
### 7.114 Course: Emerging Trends in Digital Health [T-WIWI-110144]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatics  
- M-WIWI-101628 - Emphasis in Informatics  
- M-WIWI-101630 - Electives in Informatics

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**Events**

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<td>2513405</td>
<td>Emerging Trends in Digital Health (Master)</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Lins, Sunyaev, Thiebes</td>
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**Competence Certificate**  
The alternative exam assessment consists of a final thesis.

**Prerequisites**  
None.

**Annotation**  
The course is usually held as a block course.
7.115 Course: Emerging Trends in Internet Technologies [T-WIWI-110143]

**Responsible:** Prof. Dr. Ali Sunyaev

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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**Competence Certificate**
The alternative exam assessment consists of a final thesis.

**Prerequisites**
None.

**Annotation**
The course is usually held as a block course.
**Course: Emissions into the Environment [T-WIWI-102634]**

**Responsible:** Ute Karl

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

**Part of:**
- M-WIWI-101412 - Industrial Production III
- M-WIWI-101471 - Industrial Production II

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**Events**

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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 related to this course:**

**Emissions into the Environment**

2581962, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Content**

Emission sources/emission monitoring/emission reduction: The lecture gives an overview of relevant emissions of air pollutants and greenhouse gases, emission monitoring and pollutant abatement options together with relevant legal regulations at national and international level. In addition, the fundamentals of circular economy, waste management and recycling are explained.

**Structure:**

Air pollution control

- Introduction, terms and definitions
- Sources of air pollutants
- Legal framework of air quality control
- Technical measures to reduce air pollutant emissions

Circular economy, recycling and waste management

- Waste collection and logistics
- Dual systems for packaging waste
- Recycling
- Thermal and biological waste treatment
- Final waste disposal

**Literature**

Wird in der Veranstaltung bekannt gegeben.
### 7.117 Course: Employment Law I [T-INFO-101329]

**Responsible:** Dr. Alexander Hoff  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101216 - Private Business Law

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Type: Employment Law I

Credits: 3

Recurrence: Each term

Version: 1
Course: Employment Law II [T-INFO-101330]

**Responsible:** Dr. Alexander Hoff  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101216 - Private Business Law

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</table>
7 COURSES

Course: Energy and Environment [T-WIWI-102650]

T

7.119 Course: Energy and Environment [T-WIWI-102650]

| Responsible: | Ute Karl |
| Organisation: | KIT Department of Economics and Management |
| Part of: | M-WIWI-101452 - Energy Economics and Technology  
M-WIWI-101468 - Environmental Economics |

| Type | Written examination |
| Credits | 4.5 |
| Recurrence | Each summer term |
| Version | 1 |

Events

| Events | Credits | Type | Recurrence | Credits |
| SS 2020 | 2581003 | Energy and Environment | 2 SWS | Lecture (V) |
| SS 2020 | 2581004 | Übungen zu Energie und Umwelt | 1 SWS | Practice (Ü) |

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

Prerequisites
None.

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

V

Energy and Environment
2581003, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The lecture focuses on the environmental impacts arising from fossil fuels use and on the methods for the evaluation of such impacts. The first part of the lecture describes the environmental impacts of air pollutants and greenhouse gases as well as technical measures for emission control. The second part covers methods of impact assessment and their use in environmental communication as well as methods for the scientific support of emission control strategies.

The topics include:

- Fundamentals of energy conversion
- Formation of air pollutants during combustion
- Technical measures to control emissions from fossil-fuel combustion processes
- External effects of energy supply (life cycle analyses of selected energy systems)
- Environmental communication on energy services (e.g. electricity labelling, carbon footprint)
- Integrated Assessment Modelling to support the European Clean Air Strategy
- Cost-effectiveness analyses and cost-benefit analyses for emission control strategies
- Monetary valuation of external effects (external costs)

Literature
Die Literaturhinweise sind in den Vorlesungsunterlagen enthalten (vgl. ILIAS)
Course: Energy and Process Technology I [T-MACH-102211]

**Responsible:** Prof. Dr.-Ing. Hans-Jörg Bauer  
Dr.-Ing. Corina Schwitzke  
Dr. Amin Velji  
Dr.-Ing. Heinrich Wirbser

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101296 - Energy and Process Technology I

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<td>Energy and Process Technology I</td>
<td>6</td>
<td>Lecture / Practice (VÜ)</td>
<td>Wirbser, Bauer, Mitarbeiter, Wagner</td>
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</table>

**Competence Certificate**

The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**

none

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

**Energy and Process Technology I**

2157961, WS 20/21, 6 SWS, Language: German, Open in study portal

**Lecture / Practice (VÜ)**

**Content**

The last third of the lecture deals with the topic *Thermal Turbomachinery*. The basic principles, the functionality and the scope of application of gas and steam turbines for the generation of electrical power and propulsion technology are addressed.

The students are able to:

- describe and calculate the basic physical-technical processes
- apply the mathematical and thermodynamical description
- reflect on and explain the diagrams and schematics
- comment on diagrams
- explain the functionality of gas and steam turbines and their components
- name the applications of thermal turbomachinery and their role in the field of electricity generation and propulsion technology
### 7.121 Course: Energy and Process Technology II [T-MACH-102212]

**Responsible:**
Dr.-Ing. Corina Schwitzke  
Dr.-Ing. Heinrich Wirbser

**Organisation:**
KIT Department of Mechanical Engineering

**Part of:**
M-MACH-101297 - Energy and Process Technology II

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<td>Lecture / Practice (VÜ)</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 related to this course:**

**Energy and Process Technology II**

2170832, SS 2020, 6 SWS, Language: German, Open in study portal

**Lecture / Practice (VÜ)**

**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.

The students are able to:

- discuss and evaluate energy resources and reserves and their utility
- review the use of energy carriers for electrical power generation
- explain the concepts and properties of power-heat cogeneration, renewable energy conversion and fuel cells and their fields of application
- comment on and compare centralized and decentralized supply concepts
- calculate the potentials, risks and economic feasibility of different strategies aiming at the protection of resources and the reduction of CO2 emissions
- name and judge on the options for solar energy utilization
- discuss the potential of geothermal energy and its utilization
7.122 Course: Energy Conversion and Increased Efficiency in Internal Combustion Engines [T-MACH-105564]

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

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

- **WS 20/21 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**
none

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

### Energy Conversion and Increased Efficiency in Internal Combustion Engines

- **2133121, WS 20/21, 2 SWS, Language: German,** [Open in study portal]

**Lecture (V)**

**Content**

1. Introduction
2. Thermodynamics of combustion engines
3. Fundamentals
4. gas exchange
5. Flow field
6. Wall heat losses
7. Combustion in gasoline engines
8. Pressure Trace Analysis
9. Combustion in Diesel engines
10. Waste heat recovery
7.123 Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

Responsible: Dr.-Ing. Meike Braun  
Dr. Frank Schönung

Organisation: KIT Department of Mechanical Engineering

Part of:  
M-MACH-101278 - Material Flow in Networked Logistic Systems  
M-MACH-104888 - Advanced Module Logistics

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<td>Braun, Schönung</td>
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</table>

Competence Certificate
Oral, 30 min. examination dates after the end of each lesson period.

Prerequisites
none

Recommendation
The content of course "Basics of Technical Logistics I" (T-MACH-109919) should be known.

Annotation
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.

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

Energy efficient intralogistic systems
2117500, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

Content
The content of course "Basics of Technical Logistics" should be known.

Organizational issues
Termine und Hinweise siehe Homepage / Aushang

Literature
Keine.
7 COURSES

Course: Energy Market Engineering [T-WIWI-107501]

Responsibility: 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-103720 - eEnergy: Markets, Services and Systems

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Events

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<td>SS 2020</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Staudt, Richter</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
Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".
The lecture has also been added in the IIP Module Basics of Liberalised Energy Markets.

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

Energy Market Engineering
2540464, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature

### 7.125 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 related to this course:*

**V Energy Networks and Regulation**

2540494, WS 20/21, 2 SWS, Open in study portal  

**Lecture (V)**
Content

Learning Goals

The student,

- understands the business model of a network operator and knows its central tasks in the energy supply system,
- has a holistic overview of the interrelationships in the network economy,
- understands the regulatory and business interactions,
- is in particular familiar with the current model of incentive regulation with its essential components and understands its implications for the decisions of a network operator
- is able to analyse and assess controversial issues from the perspective of different stakeholders.

Content of teaching

The lecture "Energy Networks and Regulation" provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead ("Energiewende", redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO
- Objectives of regulation: Fair price calculation and high standard access conditions
- The functioning of incentive regulation
- First major amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily?) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Literature


### 7.126 Course: Energy Systems Analysis [T-WIWI-102830]

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101452 - Energy Economics and Technology

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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 related to this course:**

#### Energy Systems Analysis

**2581002, WS 20/21, 2 SWS, Language: English, Open in study portal**

**Lecture (V)**

**Content**

1. Overview and classification of energy systems modelling approaches  
2. Usage of scenario techniques for energy systems analysis  
3. Unit commitment of power plants  
4. Interdependencies in energy economics  
5. Scenario-based decision making in the energy sector  
6. Visualisation and GIS techniques for decision support in the energy sector

**Learning goals:**

The student

- has the ability to understand and critically reflect the methods of energy system analysis, the possibilities of its application in the energy industry and the limits and weaknesses of this approach  
- can use select methods of the energy system analysis by her-/himself

**Literature**

Weiterführende Literatur:

Course: Energy Trade and Risk Management [T-WIWI-102691]

**Responsible:** N.N.

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

**Part of:** M-WIWI-101451 - Energy Economics and Energy Markets

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**Events**

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**Competence Certificate**

The assessment consists of a written exam (60 minutes).

**Prerequisites**

None

**Recommendation**

None

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

---

**Energy Trade and Risk Management**

2581020, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Content**

1. Introduction to Markets, Mechanisms and Interaction
2. Electricity Trading (platforms, products, mechanisms)
4. Coal Markets (reserves, supply, demand, and transport)
5. Investments and Capacity Markets
6. Oil and Gas Markets (supply, demand, trade, and players)
7. Trading Game
8. Risk Management in Energy Trading

**Organizational issues**

Termine siehe Institutsaushang

**Literature**

Weiterführende Literatur:

- www.riskglossary.com
7.128 Course: Engine Measurement Techniques [T-MACH-105169]

**Responsible:** Dr.-Ing. Sören Bernhardt

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

| SS 2020 | 2134137 | Engine measurement techniques | 2 SWS | Lecture (V) | Bernhardt |

**Competence Certificate**

oral examination, Duration: 0,5 hours, no auxiliary means

**Prerequisites**

none

**Recommendation**

T-MACH-102194 Combustion Engines I

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

<table>
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**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
7.129 Course: Engineering FinTech Solutions [T-WIWI-106193]

**Responsible:** Prof. Dr. Maxim Ulrich

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

**Part of:** M-WIWI-105036 - FinTech Innovations

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<td>Engineering FinTech Solutions</td>
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</table>

**Competence Certificate**

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

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

### Engineering FinTech Solutions

**Content**

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

This project invites students to either pursue their own FinTech innovation project or to contribute to the Chair's ongoing innovation projects.

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

In order to take the course "Engineering FinTech Solutions", students must have completed the module "Data Science for Finance" with a grade of 1.3 or better.

The total workload for this course is approximately 270 hours. This consists of regular meetings with members of the research group and time for independent work on the software project.

Students will learn to connect innovative financial research with modern information technology to build a prototype that solves some daunting tasks for professional end-users in the field of modern asset and risk management.

**Organizational issues**

Blücherstr. 17, E009; 14-tägig, tba

**Literature**

Literatur wird in der ersten Vorlesung bekannt gegeben.

### Engineering FinTech Solutions

**Content**

This project invites students to either pursue their own FinTech innovation project or to contribute to the Chair's ongoing innovation projects. Students will learn to connect innovative financial research with modern information technology to build a prototype that solves some daunting tasks for professional end-users in the field of modern asset and risk management. The course is targeted to students with strong knowledge in the field of computational risk and asset management and strong programming skills. It offers students the opportunity to develop an algorithmic solution and hence ample their programming experience and their understanding of financial economics or asset and risk management.

**Organizational issues**

Geb. 09.21 Raum E009, Termine werden bekannt gegeben
### 7.130 Course: Engineering Hydrology [T-BGU-108943]

**Responsible:** Dr.-Ing. Uwe Ehret  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-WIWI-104837 - Natural Hazards and Risk Management

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<tr>
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<td>2 SWS</td>
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</table>

**Competence Certificate**  
See German version.

**Prerequisites**  
None
7.131 Course: Engineering Interactive Systems [T-WIWI-110877]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104080 - Designing Interactive Information Systems

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Events

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<tbody>
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Competence Certificate
Alternative exam assessment. The assessment consists of a one-hour exam and the implementation of a Capstone project. Details will be announced at the beginning of the course.

Prerequisites
None

Recommendation
None

Annotation
The course is held in English.

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

Engineering Interactive Systems
2540420, WS 20/21, 3 SWS, Language: English, Open in study portal

Literature
Siehe Englische Literatur
4.5

Recurrence
Each winter term

Version
2

Competence Certificate
Please note that the exam for first writers will be offered for the last time in winter semester 2019/2020. A last examination possibility exists in the summer semester 2020 (only for repeaters).

The assessment of this course is a written (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Prerequisites
None
### 7.133 Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

**Responsible:** Prof. Dr. Orestis Terzidis  
**Organisation:** KIT Department of Economics and Management

**Part of:**  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101507 - Innovation Management

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**Competence Certificate**  
Please note: The seminar cannot be offered in the winter semester 2019/2020 due to organizational reasons. Alternative exam assessment.

**Prerequisites**  
None

**Recommendation**  
None
7.134 Course: Entrepreneurship [T-WIWI-102864]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
          M-WIWI-101507 - Innovation Management
          M-WIWI-105010 - Student Innovation Lab (SIL) 1

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Events
SS 2020 2545001 Entrepreneurship 2 SWS Lecture (V) Terzidis

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

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

Entrepreneurship 2545001, SS 2020, 2 SWS, Language: English, Open in study portal

Literature
Füglistaller, Urs, Müller, Christoph und Volery, Thierry (2008): Entrepreneurship
Ries, Eric (2011): The Lean Startup
7.135 Course: Entrepreneurship Research [T-WIWI-102894]

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

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

**Part of:**
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101488 - Entrepreneurship (EnTechnon)

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<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Terzidis, Henn</td>
</tr>
</tbody>
</table>

**Competence Certificate**
The performance review is done via a so called other methods of performance review (term paper) (alternative exam assessment). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The topics will be prepared in groups. The presentation of the results is done during a a block period seminar at the end of the semester. Students have to be present all day long during the seminar.

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

**Entrepreneurship Research**

2545002, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Organizational issues**

1. Termin: Do, 23.04.2020, 09:00 - 13:00 Uhr
2. Termin: Mi, 15.07.2020, 09:00 - 16:00 Uhr
   Beide Termine finden in Geb. 01.85, Raum 511 statt

**Literature**

Wird im Seminar bekannt gegeben.
7.136 Course: Environmental and Resource Policy [T-WIWI-102616]

Responsible: Rainer Walz
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101468 - Environmental Economics

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</table>

Events

| SS 2020  | 2560548 | Environmental and Ressource Policy | 2 SWS | Lecture / Practice (VÜ) | Walz |

Competence Certificate
See German version

Recommendation
It is recommended to already have knowledge in the area of industrial organization and economic policy. This knowledge may be acquired in the courses Introduction to Industrial Organization [2520371] and Economic Policy [2560280].

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

Organizational issues

Literature
Weiterführende Literatur:
Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg
OECD: Environmental Performance Review Germany, Paris
Responsible: Dr. Charlotte Kämpf
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-WIWI-104837 - Natural Hazards and Risk Management

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<td>WS 20/21</td>
<td>6224905</td>
<td>Umweltkommunikation / Environmental Communication</td>
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<td>SWS</td>
<td>Seminar</td>
<td>Kämpf</td>
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</table>

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

Prerequisites
Examination Prerequisite Environmental Communication must be passend.

Recommendation
None

Annotation
none
7.138 Course: Environmental Economics and Sustainability [T-WIWI-102615]

- **Responsible:** Prof. Dr. Rainer Walz
- **Organisation:** KIT Department of Economics and Management
- **Part of:** M-WIWI-101468 - Environmental Economics

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**Competition 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].
7.139 Course: Environmental Law [T-INFO-101348]

Responsible: Dr. Johannes Eichenhofer
Organisation: KIT Department of Informatics
Part of: M-INFO-101217 - Public Business Law
M-WIWI-101468 - Environmental Economics

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<td>Each term</td>
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</table>
T Course: European and International Law [T-INFO-101312]

**Responsible:** Ulf Brühann  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101217 - Public Business Law

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<td>Europäisches und Internationales Recht</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Brühann</td>
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</table>
7.141 Course: Examination Prerequisite Environmental Communication [T-BGU-106620]

**Responsible:** Dr. Charlotte Kämpf

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

**Part of:** M-WIWI-104837 - Natural Hazards and Risk Management

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<td>Umweltkommunikation / Environmental Communication</td>
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<td>2 SWS Seminar (S)</td>
<td>Kämpf</td>
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**Competence Certificate**

2 literature annotations, appr. 150 words each, and short presentation, appr. 10 min.

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
7.142 Course: Exercises in Civil Law [T-INFO-102013]

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

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101191 - Commercial Law

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<td>Exercises in Civil Law</td>
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<td>SS 2020</td>
<td>24926</td>
<td>Case Studies in Civil Law</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>Käde, Hägle</td>
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<td>WS 20/21</td>
<td>24011</td>
<td>Commercial and Corporate Law</td>
<td>2</td>
<td>Lecture (V)</td>
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<td>WS 20/21</td>
<td>24017</td>
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<td>Lecture (V)</td>
<td>Dreier, Käde</td>
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7.143 Course: Experimental Economics [T-WIWI-102614]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-101453 - Applied Strategic Decisions
M-WIWI-101505 - Experimental Economics
M-WIWI-103118 - Data Science: Data-Driven User Modeling

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<td>Each winter term</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

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

Experimental Economics
2540489, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
Experiments have become a valuable tool in Economics and Information Systems research. Nearly all fields of the economic discipline use experiments to verify theoretical predictions and to identify cause-effect relationships. 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 in the Information Systems research domain, and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2. Aufl. 2006.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.
7.144 Course: Experimental Lab Class in Welding Technology, in Groups [T-MACH-102099]

**Responsible:** Dr.-Ing. Stefan Dietrich

**Organisation:** KIT Department of Mechanical Engineering

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

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<td>Welding Lab Course, in groups</td>
<td>3 SWS</td>
<td>Practical course (P)</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 related to this course:

**Welding Lab Course, in groupses**

2173560, WS 20/21, 3 SWS, Language: German, [Open in study portal](#)

**Content**

The lab takes place at the beginning of the winter semester break once a year. The registration is possible during the lecture period in the secretariat of the Institute of Applied Materials (IAM – WK). The lab is carried out in the Handwerkskammer Karlsruhe.

**learning objectives:** The students are capable to name a survey of current welding processes and their suitability for joining different metals. The students can evaluate the advantages and disadvantages of the individual procedures. The students have weld with different welding processes.

**Literature**

wird im Praktikum ausgegeben
### Course: Extraordinary additional course in the module Cross-Functional Management Accounting [T-WIWI-108651]

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

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<td>Each term</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.
**7.146 Course: Fabrication Processes in Microsystem Technology [T-MACH-102166]**

**Responsible:** Dr. Klaus Bade  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101291 - Microfabrication

**Type**  
**Oral examination**

**Credits**  
3

**Recurrence**  
Each term

**Version**  
1

**Events**

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<td>Each term</td>
<td>Lecture (V)</td>
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</table>

**Competence Certificate**  
Oral examination, 20 minutes

**Prerequisites**  
none

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

**Fabrication Processes in Microsystem Technology**  
2143882, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Content**  
The lecture offers an advanced understanding of manufacturing processes in microsystem technology. Basic aspects of microtechnological processing will be introduced. With examples from semiconductor microfabrication and microsystem technology the base processing steps for conditioning and finishing, patterning, removal are imparted. Nano-patterning is covered is also included and the micro-nano interface is discussed. By the help of typical processing steps elementary mechanisms, process execution, and equipment are explained. Additionally quality control, process control and environmental topics are included

**Literature**

M. Madou  
Fundamentals of Microfabrication  
CRC Press, Boca Raton, 1997  
W. Menz, J. Mohr, O. Paul  
Mikrosystemtechnik für Ingenieure  
Dritte Auflage, Wiley-VCH, Weinheim 2005  
L.F. Thompson, C.G. Willson, A.J. Bowden  
Introduction to Microlithography  
Content
The lecture offers a specialization in manufacturing technology for structure generation in microtechnology. Basic aspects of microtechnical manufacturing are introduced. By means of examples from chip technology and microsystem technology, the basic techniques of pre- and post-treatment, structure build-up, decoating for the production of semi-finished products, tools and micro components are taught. Processes for the production of nanostructures and the nano/micro interface are also dealt with. In typical examples, elementary mechanisms, process control and plant engineering are presented after the production sequence has been introduced. In addition, aspects of production measurement technology, process control and environment, especially for wet processes, are also included.

Table of contents
1. Basics of microtechnical production
2. General manufacturing steps
   2.1 Pretreatment / Cleaning / Rinsing
   2.2 Coating processes (from spin coating to self-assembly)
   2.3 Microstructuring: additive and subtractive
   2.4 Decoating
3. Microtechnical tool production: masks and forming tools
4. Interconnects (Damascene process), modern conductor path construction
5. Wet processes in the LIGA process
6. Design of process sequences

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
7.147 Course: Failure of Structural Materials: Deformation and Fracture [T-MACH-102140]

**Responsible:** Prof. Dr. Peter Gumbsch  
Dr. Daniel Weygand

**Organisation:** KIT Department of Mechanical Engineering

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

**Events**

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<td>Each winter term</td>
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<td>2181711</td>
<td>Failure of structural materials: deformation and fracture</td>
<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Gumbsch, Weygand</td>
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</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 related to this course:*

**Failure of structural materials: deformation and fracture**

2181711, WS 20/21, 3 SWS, Language: German, [Open in study portal](#)
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

The student

- Has the basic understanding of mechanical processes to explain the relationship between externally applied load and materials strength.
- Can explain the foundation of linear elastic fracture mechanics and is able to determine if this concept can be applied to a failure by fracture.
- Can describe the main empirical materials models for deformation and fracture and can apply them.
- Has the physical understanding to describe and explain phenomena of failure.

Preliminary knowledge in mathematics, mechanics and materials science recommended

Regular attendance: 22.5 hours
Self-study: 97.5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Organizational Issues
Übungstermine werden in der Vorlesung bekannt gegeben!

Literature

- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe
**7.148 Course: Failure of Structural Materials: Fatigue and Creep [T-MACH-102139]**

**Responsible:** Dr. Patric Gruber  
Prof. Dr. Peter Gumbsch  

**Organisation:** KIT Department of Mechanical Engineering  

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

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**Events**

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<td>2181715</td>
<td>Failure of Structural Materials: Fatigue and Creep</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Gruber, Gumbsch</td>
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</tbody>
</table>

**Competence Certificate**
oral exam ca. 30 minutes  
nom tools or reference materials

**Prerequisites**
none

**Recommendation**
preliminary knowledge in mathematics, mechanics and materials science

*Below you will find excerpts from events related to this course:*
Content
1 Fatigue
   1.1 Introduction
   1.2 Lifetime
   1.3 Fatigue Mechanisms
   1.4 Material Selection
   1.5 Notches and Shape Optimization
   1.6 Case Studies: ICE-Accidents
2 Creep
   2.1 Introduction
   2.2 High Temperature Plasticity
   2.3 Phänomenological Description of Creep
   2.4 Creep Mechanisms
   2.5 Alloying Effects

The student
   • has the basic understanding of mechanical processes to explain the relationships between externally applied load and materials strength.
   • can describe the main empirical materials models for fatigue and creep and can apply them.
   • has the physical understanding to describe and explain phenomena of failure.
   • can use statistical approaches for reliability predictions.
   • can use its acquired skills, to select and develop materials for specific applications.

preliminary knowledge in mathematics, mechanics and materials science recommended
regular attendance: 22.5 hours
self-study: 97.5 hours

The assessment consists of an oral examination (ca. 30 min) according to Section 4(2), 2 of the examination regulation.

Literature
   • Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relativ einfach aber dennoch umfassender Überblick für metallische Werkstoffe
   • Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); Standardwerk über Ermüdung, alle Materialklassen, umfangreich, für Einsteiger und Fortgeschrittene
7.149 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>Financial Analysis</td>
<td>2</td>
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<td>SS 2020</td>
<td>2530206</td>
<td>Übungen zu Financial Analysis</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>Luedecke</td>
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</table>

**Competence Certificate**
See German version.

**Prerequisites**
None

**Recommendation**
Basic knowledge in corporate finance, accounting, and valuation is required.

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

**Financial Analysis**

2530205, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Literature**

7.150 Course: Financial Econometrics [T-WIWI-103064]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Type | Credits | Recurrence | Version
--- | --- | --- | ---
Written examination | 4.5 | Irregular | 2

Events
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<td>Financial Econometrics</td>
<td>2 SWS</td>
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<td>SS 2020</td>
<td>2520023</td>
<td>Übungen zu Financial Econometrics</td>
<td>2 SWS</td>
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</table>

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Annotation
The course takes place each second summer term: 2018/2020....

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

Financial Econometrics
2520022, SS 2020, 2 SWS, Language: English, Open in study portal

Content
Learning objectives:
The student
- shows a broad knowledge of financial econometric estimation and testing techniques
- is able to apply his/her technical knowledge using software in order to critically assess empirical problems

Content:
ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises

Requirements:
It is recommended to attend the course Economics III: Introduction to Econometrics [2520016] prior to this course.

Workload:
Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours
Exam preparation: 40 hours
Literature
Additional literature will be discussed in the lecture.
7.151 Course: Financial Econometrics II [T-WIWI-110939]

**Responsible:** Prof. Dr. Melanie Schienle

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

**Part of:**
- M-WIWI-101638 - Econometrics and Statistics I
- M-WIWI-101639 - Econometrics and Statistics II

**Type:** Written examination

**Credits:** 4.5

**Recurrence:** see Annotations

**Version:** 1

**Events**

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<td>Financial Econometrics II</td>
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<td>2521303</td>
<td>Übung zu Financial Econometrics II</td>
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<td>Practice (Ü)</td>
<td>Görgen, Buse, Schienle</td>
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</table>

**Competence Certificate**
The assessment consists of a written exam (90 minutes).

**Prerequisites**
None

**Recommendation**
Knowledge of the contents covered by the course "Financial Econometrics"

**Annotation**
Course language is English
The course takes place each second winter term starting in WS2020/21
7.152 Course: Financial Intermediation [T-WIWI-102623]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2
- M-WIWI-101502 - Economic Theory and its Application in Finance

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**Events**

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<td>2 SWS</td>
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<td>Übung zu Finanzintermediation</td>
<td>1 SWS</td>
<td>Practice (Ü)</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 related to this course:

### Financial Intermediation

**2530232, WS 20/21, 2 SWS, Language: German,** [Open in study portal](#)

**Lecture (V)**

**Content**

The lecture covers the following topics:

- 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

**Learning outcomes: Students**

- are in a position to describe the arguments for the existence of financial intermediaries,
- are able of discuss and analyze both static and dynamic aspects of contractual relationships between banks and borrowers,
- are able to discuss the macroeconomic role of the banking system,
- are in a position to explain the fundamental principles of the prudential regulation of banks and are able to recognize and evaluate the implications of specific regulations.

**Workload:**

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

**Literature**

**Weiterführende Literatur:**

### Course: Firm creation in IT security [T-WIWI-110374]

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

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

**Part of:** M-WIWI-101488 - Entrepreneurship (EnTechnon)

**Type**
Examination of another type

**Credits**
3

**Recurrence**
Irregular

**Version**
1

#### Events

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<th>Recurrence</th>
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<td>2545109</td>
<td>Basic concepts of Entrepreneurship in the area of IT security</td>
<td>Seminar (S)</td>
<td>2 SWS</td>
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<tr>
<td>WS 20/21</td>
<td>2545109</td>
<td>Business Planning for Founders in the field of IT-Security</td>
<td>Seminar (S)</td>
<td>2 SWS</td>
<td>Irregular</td>
<td>1</td>
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</tbody>
</table>

**Competence Certificate**
Alternative exam assessment. The grade consists of the presentation and the written elaboration.

**Prerequisites**
None

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

### Basic concepts of Entrepreneurship in the area of IT security

**2545109, SS 2020, 2 SWS, Language: German/English, Open in study portal**

**Seminar (S)**

**Content**
In order to identify opportunities, the participants should identify fields for entrepreneurial opportunities in a systematic web research. For this purpose, Systematic Mapping procedures will be adapted to the research of general web sources and applied to the research of interesting fields in the area of cyber security.

**Information about the seminar:**
In the seminar you will work in groups of max. 4 persons. Group applications are welcome but not a prerequisite for participation. Some of the seminars will be held in English.

The focus of the seminar is Opportunity Recognition in the field of IT-Security, followed by ideation sessions with the aim to find possible applications for technologies that are developed at the KIT. Prototyping and also Pitching are part of the seminar.

**Target group:**
Master Students

**Information on the allocation of seminar places:**
The registration for the seminar is possible in the Wiwi portal in the period from 11.09.2019 to 05.10.2019 at 23:55 clock. To apply for the seminar, please send us a letter of motivation (max. 5 sentences).

**Seminar contents:**

- To identify opportunities, the participants should identify fields for entrepreneurial opportunities in a systematic web research. For this purpose, Systematic Mapping procedures will be adapted to the research of general web sources and applied to the research of interesting fields in the area of cyber security.
- All information will be discussed with experts on the second seminar day. The aim of the first two sessions is to develop a systematic segmentation of market needs.
- After the teams have been formed, the workshop “Technology Application Selection (TAS)” follows. This is a framework developed by EnTechnon that will help the teams to develop concrete business ideas based on given technologies. The three steps of the TAS will be the content of the third and fourth seminar days. Participants will generate ideas and then - based on specific criteria that we will provide - choose an idea on which they will build their value proposition.
- The final session before the final day will deal with prototyping and validation. This will use rapid prototyping and validation methods from the design thinking environment.
- On the last day - before their final presentations - the participants learn how to present the idea in a short presentation (pitch) to an interested audience.
Course: Firm creation in IT Security [T-WIWI-110374]

Organizational issues
Blockveranstaltung im Rahmen des KASTEL Projekts

Business Planning for Founders in the field of IT-Security
2545109, WS 20/21, 2 SWS, Language: German/English, Open in study portal

Content
Information about the seminar:
The seminar will be conducted in Zoom. More information about the process will be available in ILIAS.

In the seminar you will work in groups of max. 4 persons. Group applications are welcome but not a prerequisite for participation.

Most of the seminars will be held in English.

The focus of the seminar is Opportunity Recognition in the field of IT-Security, followed by ideation sessions with the aim to find possible applications for Cyber Security technologies that are developed at the KIT. Prototyping and also Pitching are part of the seminar.

Target group:
Master Students

Information on the allocation of seminar places:
The registration for the seminar is possible in the Wiwi portal in the period from 09.08.2020 to 23.10.2020 at 23:59 o’clock. To apply for the seminar, please send us a letter of motivation (max. 5 sentences).

Important Dates:
18.11.2020, 09:00-15:00
02.12.2020, 09:00-15:00
16.12.2020, 09:00-15:00

Deliverables:
Homework completed in the meantime among seminar days
Final presentation on 16.12.2020
Business Plan (7000 Words)

After completing this course, the course participants will be able to

- Characterize the specifications of Technology Push and Market Pull
- Describe why personal and team core values are important for team formation and how they can affect start-up projects.
- Develop a sound value proposition for a target customer
- Recognize Business Opportunities in the field of IT-Security applying the TAS Approach
- Learn the processes of Design Thinking
- Build a Prototype
- Create Business Ideas
- Pitch their Business Ideas to potential investors

Organizational issues
Blockveranstaltung im Rahmen des KASTEL Projekts
T 7.154 Course: Fixed Income Securities [T-WIWI-102644]

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### Organisation
- 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>Bond Markets</td>
<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
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### Competence Certificate
The examination is offered for first-time writers for the last time in the winter semester 2020/21 and (only) for repeaters in the summer semester 2021.

The assessment takes place in the form of a written examination (75 minutes) according to §4(2), 1 SPO. The examination takes place during the semester break. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

### Prerequisites
None

### Recommendation
Knowledge from the course "Derivatives" is very helpful.

### Annotation
The course will no longer be offered from winter semester 2020/21.

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

### Content
The lecture "Bond Markets" deals with the national and international bond markets, which are an important source of financing for companies, as well as for the public sector. After an overview of the most important bond markets, different yield definitions are discussed. Based on this, the concept of the yield curve is presented. In addition, the theoretical and empirical relationships between ratings, default probabilities and spreads are analyzed. The focus will then be on questions regarding the valuation, measurement, management and control of credit risks.

The total workload for this course is approximately 135 hours (4.5 credits).

The assessment consists of a written exam (75min.) (according to §4(2), 1 SPO). A bonus can be earned through successful participation in the tutorial sessions. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one level (0.3 or 0.4). The examination is offered in each semester and can be repeated at any regular examination date.

Students deepen their knowledge of national and international bond markets. They gain knowledge of the traded instruments and their key figures for describing default risk such as ratings, default probabilities or credit spreads.

### Organizational issues
Blockveranstaltung: Do 14:00-19:00 Uhr, Fr 9:45-17:15 Uhr
05./06.11., 19./20.11., 03./04.12.20
# 7.155 Course: Fluid Power Systems [T-MACH-102093]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101266 - Automotive Engineering

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## 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
7.156 Course: Foundry Technology [T-MACH-105157]

**Responsible:** Dr.-Ing. Christian Wilhelm

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

| SS 2020 | 2174575 | Foundry Technology | 2 SWS | Lecture (V) | Wilhelm |

**Competence Certificate**

oral exam; about 25 minutes

**Prerequisites**

None

**Recommendation**

It is strongly recommended to pass the two courses "Materials Science I" (T-MACH-102078) and "Materials Science II" (T-MACH-102079).

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

**Foundry Technology**

2174575, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)
Content
Moulding and casting processes
Solidifying of melts
Castability
Fe-Alloys
Non-Fe-Alloys
Moulding and additive materials
Core production
Sand reclamation
Design in casting technology
Casting simulation
Foundry Processes

Learning objectives:
The students know the specific moulding and casting techniques and are able to describe them in detail. The students know the application of moulding and casting techniques concerning castings and metals, their advantages and disadvantages in comparison, their application limits and are able to describe these in detail.
The students know the applied metals and are able to describe advantages and disadvantages as well as the specific range of use.
The students are able, to describe detailed mould and core materials, technologies, their application focus and mould-affected casting defects.
The students know the basics of casting process of any casting parts concerning the above mentioned criteria and are able to describe detailed.

Requirements:
Required: Material Science and Engineering I and II

Workload:
The workload for the lecture Foundry Technology is 120 h per semester and consists of the presence during the lecture (21 h) as well as preparation and rework time at home (99 h).

Organizational issues
Die Kapitel zur Vorlesung werden als sprachunterstützte PPT-Dateien in Ilias, dem Fortschritt der Vorlesung entsprechend, zur Verfügung gestellt.
Bis auf weiteres werden zu den im Vorlesungsverzeichnis wiedergegebenen Terminen (= ursprünglich geplante Vorlesungen) freitags ab 9:45 Uhr Rückfragemöglichkeit der Studierenden mit dem Dozenten eingerichtet. Der erste Rückfragetermin findet am 8.5.2020 statt. Die Kommunikationsform für diese Rückfragetermine (E-Mail, MS Teams o.a.) steht noch nicht fest und wird noch bekanntgegeben. Der Dozent ist grundsätzlich unter fcs-wilhelm@outlook.de zu erreichen.

Literature
Literaturhinweise werden in der Vorlesung gegeben
Reference to literature, documentation and partial lecture notes given in lecture
7.157 Course: Freight Transport [T-BGU-106611]

**Responsible:** Bastian Chlond

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

**Part of:**
- M-BGU-101064 - Fundamentals of Transportation
- M-BGU-101065 - Transportation Modelling and Traffic Management

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**Events**

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<td>2 SWS Lecture / Practice (VÜ)</td>
<td>Chlond</td>
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**Competence Certificate**

written exam, 60 min.

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
### 7.158 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

**Responsible:** Dr.-Ing. Bernhard Ulrich Kehrwald  
Dr.-Ing. Heiko Kubach  

**Organisation:** KIT Department of Mechanical Engineering  

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

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**Events**

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<td>WS 20/21</td>
<td>2133109</td>
<td>Fuels and Lubricants for Combustion Engines</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
</tr>
</tbody>
</table>

**Competence Certificate**

oral examination, Duration: ca. 25 min., no auxiliary means

**Prerequisites**

none

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

### Fuels and Lubricants for Combustion Engines

*2133109, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)*

**Content**

Introduction and basics

Fuels for Gasoline and Diesel engines

Hydrogen

Lubricants for Gasoline and Diesel engines

Coolants for combustion engines

**Literature**

Skript
7.159 Course: Functional Ceramics [T-MACH-105179]

**Responsible:** Dr. Manuel Hinterstein  
Dr.-Ing. Wolfgang Rheinheimer  

**Organisation:** KIT Department of Mechanical Engineering

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

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<tr>
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<td>Each winter term</td>
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**Events**

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<tbody>
<tr>
<td>WS 20/21</td>
<td>2 SWS</td>
<td>Functional Ceramics</td>
<td>Hinterstein</td>
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**Competence Certificate**

The assessment consists of an oral exam (20 min) taking place at the agreed date.

**Auxiliary means:** none

The re-examination is offered upon agreement.

**Prerequisites**

none
**Course: Fundamentals for Design of Motor-Vehicle Bodies I [T-MACH-102116]**

**Responsible:** Horst Dietmar Bardehle  
**Organisation:** KIT Department of Mechanical Engineering  

**Part of:** M-MACH-101266 - Automotive Engineering

<table>
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**Events**

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<tr>
<td>WS 20/21</td>
<td>2113814</td>
<td>Fundamentals for Design of Motor-Vehicles Bodies I</td>
<td>1 SWS</td>
<td>Bardehle</td>
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</table>

**Competence Certificate**  
Oral group examination  
Duration: 30 minutes  
Auxiliary means: none

**Prerequisites**  
none

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

**V Fundamentals for Design of Motor-Vehicles Bodies I**

2113814, WS 20/21, 1 SWS, Language: German, Open in study portal  
Lecture (V)

**Content**

1. History and design  
2. Aerodynamics  
3. Design methods (CAD/CAM, FEM)  
4. Manufacturing methods of body parts  
5. Fastening technology  
6. Body in white / body production, body surface

**Learning Objectives:**  
The students have an overview of the fundamental possibilities for design and manufacture of motor-vehicle bodies. They know the complete process, from the first idea, through the concept to the dimensioned drawings (e.g. with FE-methods). They have knowledge about the fundamentals and their correlations, to be able to analyze and to judge relating components as well as to develop them accordingly.

**Organizational issues**  
Termine, nähere Informationen und eventuelle Terminänderungen: siehe Institutshomepage  
Dates and further information will be published on the homepage of the institute

**Literature**

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden  
2. Automobil Revue, Bern (Schweiz)  
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg
7 COURSES

Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

7.161 Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

Responsible: Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101266 - Automotive Engineering

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Events

| SS 2020 | 2114840 | Fundamentals for Design of Motor-Vehicles Bodies II | 1 SWS | Lecture (V) | Bardehle |

Competence Certificate

Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites

none

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

V Fundamentals for Design of Motor-Vehicles Bodies II
2114840, SS 2020, 1 SWS, Language: German, Open in study portal
Lecture (V)

Content

1. Body properties/testing procedures
2. External body-parts
3. Interior trim
4. Compartment air conditioning
5. Electric and electronic features
6. Crash tests
7. Project management aspects, future prospects

Learning Objectives:

The students know that, often the design of seemingly simple detail components can result in the solution of complex problems. They have knowledge in testing procedures of body properties. They have an overview of body parts such as bumpers, window lift mechanism and seats. They understand, as well as, parallel to the normal electrical system, about the electronic side of a motor vehicle. Based on this they are ready to analyze and to judge the relation of these single components. They are also able to contribute competently to complex development tasks by imparted knowledge in project management.

Organizational issues

Voraussichtliche Termine, nähere Informationen und evtl. Änderungen:
siehe Institutshomepage.

Scheduled dates, further Information and possible changes of date:
see homepage of the institute.

Literature

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg
# 7.162 Course: Fundamentals in the Development of Commercial Vehicles I [T-MACH-105160]

**Responsible:** Dr. Christof Weber  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101265 - Vehicle Development

<table>
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## Events

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<td>WS 20/21</td>
<td>2113812</td>
<td>Fundamentals in the Development of Commercial Vehicles I</td>
<td>1 SWS</td>
<td>Lecture (V)</td>
<td>Weber</td>
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</table>

## Competence Certificate

**Oral group examination**  
**Duration:** 30 minutes  
**Auxiliary means:** none

**Prerequisites**

none

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

## Fundamentals in the Development of Commercial Vehicles I

**2113812, WS 20/21, 1 SWS, Language: German, Open in study portal**

### Content

1. Introduction, definitions, history  
2. Development tools  
3. Complete vehicle  
4. Cab, bodyshell work  
5. Cab, interior fitting  
6. Alternative drive systems  
7. Drive train  
8. Drive system diesel engine  
9. Intercooled diesel engines

### Learning Objectives:

The students have proper knowledge about the process of commercial vehicle development starting from the concept and the underlying original idea to the real design. They are able to plan, to steer, and to handle this process. They know that the customer requirements, the technical realisability, the functionality and the economy are important drivers.

The students are able to develop parts and components. Furthermore they have knowledge about different cab concepts, the interior and the interior design process. Consequently they are ready to analyze and to judge concepts of commercial vehicles as well as to participate competently in the commercial vehicle development.

### Organizational issues

Termine und Nähere Informationen: siehe Institutshomepage  
Dates and further information will be published on the homepage of the institute.
Literature
Course: Fundamentals in the Development of Commercial Vehicles II [T-MACH-105161]

Responsible: Dr. Christof Weber
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101265 - Vehicle Development

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Events

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<tr>
<td>SS 2020</td>
<td>2114844</td>
<td>Fundamentals in the Development of Commercial Vehicles II</td>
<td>1 SWS</td>
<td>Lecture (V)</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 related to this course:

Fundamentals in the Development of Commercial Vehicles II  
2114844, SS 2020, 1 SWS, Language: German, Open in study portal

Content
1. Gear boxes of commercial vehicles
2. Intermediate elements of the drive train
3. Axle systems
4. Front axles and driving dynamics
5. Chassis and axle suspension
6. Braking System
7. Systems
8. Excursion

Learning Objectives:
The students know the advantages and disadvantages of different drives. Furthermore they are familiar with components, such as transfer box, propeller shaft, powered and non-powered front axle etc. Beside other mechanical components, such as chassis, axle suspension and braking system, also electric and electronic systems are known. Consequently the student are able to analyze and to judge the general concepts as well as to adjust them precisely with the area of application.

Organizational issues
genau Terme, nähere Informationen und eventuelle Terminänderungen:  
siehe Institutshomepage.
Literature
1. HILGERS, M.: Nutzfahrzeugtechnik lernen, Springer Vieweg, ISSN: 2510-1803
7.164 Course: Fundamentals of Automobile Development I [T-MACH-105162]

Responsible: Hon.-Prof. Rolf Frech
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101265 - Vehicle Development

<table>
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<tr>
<td>WS 20/21</td>
<td>2113810</td>
<td>Fundamentals of Automobile Development I</td>
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<td>Lecture (V)</td>
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<tr>
<td>WS 20/21</td>
<td>2113851</td>
<td>Principles of Whole Vehicle Engineering I</td>
<td></td>
<td>Lecture (V)</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 related to this course:

Fundamentals of Automobile Development I

2113810, WS 20/21, 1 SWS, Language: German,

Content

1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Learning Objectives:

The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

Organizational issues

Termine und nähere Informationen finden Sie auf der Institutshomepage.
Kann nicht mit Lehrveranstaltung 2113851 kombiniert werden.
Date and further information will be published on the homepage of the institute.
Cannot be combined with lecture 2113851.

Literature

Skript zur Vorlesung wird zu Beginn des Semesters ausgegeben
The scriptum will be provided during the first lessons
Principles of Whole Vehicle Engineering I
2113851, WS 20/21, 1 SWS, Language: English, Open in study portal

Content
1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Learning Objectives:
The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

Organizational issues
Termine und nähere Informationen finden Sie auf der Institutshomepage.
Dats and further information will be published on the homepage of the institute.
Kann nicht mit Lehrveranstaltung 2113810 kombiniert werden
Cannot be combined with lecture 2113810.

Literature
Skript zur Vorlesung wird zu Beginn des Semesters ausgegeben
The scriptum will be provided during the first lessons
7.165 Course: Fundamentals of Automobile Development II [T-MACH-105163]

- **Responsible:** Hon.-Prof. Rolf Frech
- **Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101265 - Vehicle Development

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<td>SS 2020 2114842 Fundamentals of Automobile Development II</td>
<td>1 SWS</td>
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<tr>
<td>SS 2020 2114860 Principles of Whole Vehicle Engineering II</td>
<td>1 SWS</td>
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**Competence Certificate**
Written examination

**Duration:** 90 minutes

**Auxiliary means:** none

**Prerequisites**
one

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

**Fundamentals of Automobile Development II**
2114842, SS 2020, 1 SWS, Language: German, Open in study portal

**Content**
1. Application-oriented material and production technology I
2. Application-oriented material and production technology II
3. Overall vehicle acoustics in the automobile development
4. Drive train acoustics in the automobile development
5. Testing of the complete vehicle
6. Properties of the complete automobile

**Learning Objectives:**
The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

**Organizational issues**
Vorlesung findet als Blockvorlesung statt,
Geb. 70.04 (Campus Ost), Raum 219, Termine werden auf der Institutshomepage bekanntgegeben
Kann nicht mit der Veranstaltung [2114860] kombiniert werden.
Cannot be combined with lecture [2114860].

**Literature**
Skript zur Vorlesung ist über ILIAS verfügbar.
Principles of Whole Vehicle Engineering II
2114860, SS 2020, 1 SWS, Language: English, Open in study portal

Content
1. Application-oriented material and production technology I
2. Application-oriented material and production technology II
3. Overall vehicle acoustics in the automobile development
4. Drive train acoustics in the automobile development
5. Testing of the complete vehicle
6. Properties of the complete automobile

Learning Objectives:
The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

Organizational issues
Kann nicht mit der Veranstaltung [2114842] kombiniert werden.
Cannot be combined with lecture [2114842].
Raum 219, Geb. 70.04, Campus Ost.
Genaue Termine entnehmen Sie bitte der Institushomepage.
Scheduled dates:
see homepage of the institute.

Literature
Das Skript zur Vorlesung ist über ILIAS verfügbar.
Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

**Responsible:** Prof. Dr. Olaf Deutschmann  
Prof. Dr. Jan-Dierk Grunwaldt  
Dr.-Ing. Heiko Kubach  
Hon.-Prof. Dr. Egbert Lox

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

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<td>Fundamentals of catalytic exhaust gas aftertreatment</td>
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<td>Lox, Grunwaldt, Deutschmann</td>
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</table>

**Prerequisites**

none

**Competence Certificate**

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

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

**Fundamentals of catalytic exhaust gas aftertreatment**

2134138, SS 2020, 2 SWS, Language: German, [Open in study portal]

**Organizational issues**

Blockvorlesung, Termin und Ort werden auf der Homepage des IFKM und ITCP bekannt gegeben.

**Literature**

Skrift, erhältlich in der Vorlesung


**Fundamentals of catalytic exhaust gas aftertreatment**

2134138, WS 20/21, 2 SWS, Language: German, [Open in study portal]

**Organizational issues**

Blockvorlesung, Termin und Ort werden auf der Homepage des IFKM und ITCP bekannt gegeben.
Literature
Skrift, erhältlich in der Vorlesung

7.167 Course: Gear Cutting Technology [T-MACH-102148]

Responsible: Dr.-Ing. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101265 - Vehicle Development
M-MACH-101284 - Specialization in Production Engineering

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Events

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<td>WS 20/21</td>
<td>2149655</td>
<td>Gear Technology</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 related to this course:

Gear Technology
2149655, WS 20/21, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
The objective of the lecture is the introduction into modern gear technology. In this respect, the basics of gear and transmission technology are reviewed in detail. The load of gears and process chains are derived through the requirements of modern drive systems. For comprehensive understanding of gear manufacturing different processes, machine technologies, tools and applications are introduced with the help of a wide range of sample components. Furthermore, current research projects are presented. Demonstrations in the production laboratory of the institute and an excursion to an industrial gear manufacturing company round off the lecture.

The following topics will be covered:

- Sample applications and the need for gearboxes
- Basics of gear and transmission technology
- Loads of gears and process chains
- Manufacturing techniques
- Heat Treatment
- Quality assurance
- Simulation techniques

Learning Outcomes:
The students ...

- know the basic terms of gearings and are able to explain the imparted basics of gear and transmission technology.
- are able to specify the different manufacturing processes and machine technologies for gear manufacturing. Furthermore, they are able to explain the functional principles and the dis-/advantages of these manufacturing processes.
- are able to read and interpret measuring records for gearings.
- are able to make an appropriate selection of a process chain for a given application. Hereby, they can determine the main impact factors of the different process steps.

Workload:
regular attendance: 21 hours
self-study: 99 hours
Literature
Medien:
Skrift zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).
T 7.168 Course: Global Logistics [T-MACH-111003]

<table>
<thead>
<tr>
<th>Responsible</th>
<th>Prof. Dr.-Ing. Kai Furmans</th>
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<td>Part of</td>
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<td>M-MACH-101282 - Global Production and Logistics</td>
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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
7.169 Course: Global Optimization I [T-WIWI-102726]

**Responsibility:** Prof. Dr. Oliver Stein

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

**Part of:** M-WIWI-101473 - Mathematical Programming

**Type:** Written examination

**Credits:** 4.5

**Recurrence:** Each summer term

**Version:** 1

**Course Description**

Please note: due to the research semester of Prof. Dr. Stein the lecture will not be offered in summer semester 2020.

Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO).

The exam is offered in the lecture of semester and the following semester.

The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.
7.170 Course: Global Optimization I and II [T-WIWI-103638]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:** M-WIWI-101473 - Mathematical Programming

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**Competence Certificate**

Please note: due to the research semester of Prof. Dr. Stein the lectures will not be offered in summer semester 2020.

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

The examination is held in the semester of the lecture and in the following semester.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.
7.171 Course: Global Optimization II [T-WIWI-102727]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101473 - Mathematical Programming

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<td>Written exam.</td>
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<td>Each summer term</td>
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**Competence Certificate**

Please note: due to the research semester of Prof. Dr. Stein the lecture will not be offered in summer semester 2020.

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

**Prerequisites**

None

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.
7.172 Course: Global Production [T-MACH-110991]

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

**Part of:**
- M-MACH-101282 - Global Production and Logistics
- M-MACH-101284 - Specialization in Production Engineering
- M-MACH-105455 - Strategic Design of Modern Production Systems

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**Events**

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<td>Global Production</td>
<td>2</td>
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</table>

**Competence Certificate**

Written Exam (60 min)

**Modeled Conditions**

The following conditions have to be fulfilled:

1. The course T-MACH-105158 - Global Production and Logistics - Part 1: Global Production must not have been started.

**Recommendation**

Participation in "T-MACH-110981 - Tutorial Global Production" is recommended, but not mandatory.

*Below you will find excerpts from events related to this course:*
Content
The lecture examines the management of global production networks of manufacturing companies. It gives an overview of the influencing factors and challenges of global production. In-depth knowledge of common methods and procedures for planning, designing and managing global production networks is imparted.
Therefore, the lecture first of all discusses the connections and interdependencies between the business strategy and the production strategy and illustrates necessary tasks for the definition of a production strategy. Methods for site selection, for the site-specific adaptation of product design and production technology as well as for the establishment of new production sites and for the adaptation of existing production networks to changing framework conditions are subsequently taught within the context of the design of the network footprint. With regard to the management of global production networks, the lecture addresses challenges associated with coordination, procurement and order management in global networks. The lecture is complemented by a discussion on the use of industry 4.0 applications in global production and current trends in planning, designing and managing global production networks.

The topics include:

- Basic conditions and influencing factors of global production (historical development, targets, chances and threats)
- Framework for planning, designing and managing global production networks
- Production strategies for global production networks
  - From business strategy to production strategy
  - Tasks of the production strategy (product portfolio management, circular economy, planning of production depth, production-related research and development)
- Design of global production networks
  - Basic types of network structures
  - Planning process for the design of the network footprint
  - Adaptation of the network footprint
  - Site selection
  - Location-specific adaptation of production technology and product design
- Management of global production networks
  - Network coordination
  - Procurement process
  - Order management
- Trends in planning, designing and managing global production networks

Learning Outcomes:
The students …

- can explain the general conditions and influencing factors of global production
- are capable to apply defined procedures for site selection and to evaluate site decisions with the help of different methods
- are able to select the adequate scope of design for siteappropriate production and product construction casespecifically
- can state the central elements in the planning process of establishing a new production site.
- are capable to make use of the methods to design and scale global production networks for company-individual problems
- are able to show up the challenges and potentials of the departments sales, procurement as well as research and development on global basis.

Workload:
regular attendance: 21 hours
self-study: 99 hours

Recommendations:
Combination with Global Production and Logistics – Part 2

Organizational issues
Vorlesungstermine montags 14:00 - 15:30 Uhr
Lectures on Mondays 14:00 - 15:30
Literature
Medien
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt
empfohlene Sekundärliteratur:

Media
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)
recommended secondary literature:
7.173 Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

**Responsible:** Prof. Dr. Stefan Nickel

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

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**Competence Certificate**

The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**

None

**Recommendation**

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

**Annotation**

The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.
Course: Großdiesel- und -gasmotoren für Schiffsantriebe [T-MACH-110816]

Responsible: Dr.-Ing. Heiko Kubach
Organisation: Part of: M-MACH-101303 - Combustion Engines II

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<td>2 SWS</td>
<td>Each summer term</td>
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</table>

Competence Certificate
oral exam, 20 minutes

Prerequisites
None

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

Large Diesel and Gas Engines for Ship Propulsions
2134154, SS 2020, 2 SWS, Language: German, Open in study portal

Content
- Introduction and History
- Types of Ships and Propulsion Systems
- Thermodynamic
- Boosting
- Design
- Fuels
- Lubricants
- Injection of liquid Fuels
- Combustions Processes for liquid Fuels
- Injection of Gaseous Fuels
- Combustion Processes for Gaseous Fuels
- Emissions
- Integration of Engines in Ships
- Large Engines in other Applications

Large Diesel and Gas Engines for Ship Propulsions
2134154, WS 20/21, 2 SWS, Language: German, Open in study portal
Content

- Introduction and History
- Types of Ships and Propulsion Systems
- Thermodynamic
- Boosting
- Design
- Fuels
- Lubricants
- Injection of liquid Fuels
- Combustion Processes for liquid Fuels
- Injection of Gaseous Fuels
- Combustion Processes for Gaseous Fuels
- Emissions
- Integration of Engines in Ships
- Large Engines in other Applications
Course: Handling Characteristics of Motor Vehicles I [T-MACH-105152]

**7.175 Course: Handling Characteristics of Motor Vehicles I [T-MACH-105152]**

**Responsible:** Dr.-Ing. Hans-Joachim Unrau  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101264 - Handling Characteristics of Motor Vehicles

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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 related to this course:**

**Handling Characteristics of Motor Vehicles I**

2113807, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Content**

1. Problem definition: Control loop driver - vehicle - environment (e.g. coordinate systems, modes of motion of the car body and the wheels)

2. Simulation models: Creation from motion equations (method according to D'Alembert, method according to Lagrange, programme packages for automatically producing of simulation equations), model for handling characteristics (task, motion equations)

3. Tyre behavior: Basics, dry, wet and winter-smooth roadway

**Learning Objectives:**

The students know the basic connections between drivers, vehicles and environment. They can build up a vehicle simulation model, with which forces of inertia, aerodynamic forces and tyre forces as well as the appropriate moments are considered. They have proper knowledge in the area of tyre characteristics, since a special meaning comes to the tire behavior during driving dynamics simulation. Consequently they are ready to analyze the most important influencing factors on the driving behaviour and to contribute to the optimization of the handling characteristics.

**Literature**

1. Willumeit, H.-P.: Modelle und Modellierungsverfahren in der Fahrzeugdynamik,  
B. G. Teubner Verlag, 1998


Industrial Engineering and Management M.Sc.  
Module Handbook as of 14/09/2020
### Course: Handling Characteristics of Motor Vehicles II [T-MACH-105153]

**Responsible:** Dr.-Ing. Hans-Joachim Unrau  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101264 - Handling Characteristics of Motor Vehicles

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**Competence Certificate**  
Oral Examination

**Duration:** 30 up to 40 minutes

**Auxiliary means:** none

**Prerequisites**

none

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

### Handling Characteristics of Motor Vehicles II  
2114838, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Content**

1. Vehicle handling: Bases, steady state cornering, steering input step, single sine, double track switching, slalom, cross-wind behavior, uneven roadway

2. Stability behavior: Basics, stability conditions for single vehicles and for vehicles with trailer

**Learning Objectives:**

The students have an overview of common test methods, with which the handling of vehicles is gauged. They are able to interpret results of different stationary and transient testing methods. Apart from the methods, with which e.g. the driveability in curves or the transient behaviour from vehicles can be registered, also the influences from cross-wind and from uneven roadways on the handling characteristics are well known. They are familiar with the stability behavior from single vehicles and from vehicles with trailer. Consequently they are ready to judge the driving behaviour of vehicles and to change it by specific vehicle modifications.

**Literature**


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Industrial Engineering and Management M.Sc.  
Module Handbook as of 14/09/2020  
398
7.177 Course: Heat Economy [T-WWI-102695]

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

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

**Part of:** M-WWI-101452 - Energy Economics and Technology

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<td>Each summer term</td>
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**Competence Certificate**
The lecture will be suspended in summer semester 2019 and 2020 and will probably be offered again in summer semester 2021.
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
None.

**Recommendation**
None

**Annotation**
See German version.
7.178 Course: High Performance Powder Metallurgy Materials [T-MACH-102157]

**Responsible:** Dr. Günter Schell  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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**Competence Certificate**  
oral exam, 20- 30 min

**Prerequisites**  
none

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

**Advanced powder metals**  
2126749, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Literature**
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005  
T 7.179 Course: High-Voltage Technology [T-ETIT-110266]

**Responsible:** Dr.-Ing. Rainer Badent

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

**Part of:** M-ETIT-101163 - High-Voltage Technology

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7.180 Course: High-Voltage Test Technique [T-ETIT-101915]

**Responsible:** Dr.-Ing. Rainer Badent

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

**Part of:** M-ETIT-101164 - Generation and Transmission of Renewable Power

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**Prerequisites**

none
7.181 Course: Human Factors in Security and Privacy [T-WIWI-109270]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
          M-WIWI-101628 - Emphasis in Informatics
          M-WIWI-101630 - Electives in Informatics

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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**

1. Successful participation in the exercises. Successful means actively participating in the tasks and its discussions. One task may be missed.
2. Also participation in the discussion lectures is required. One lecture may be missed.

**Recommendation**

The prior attendance of the lecture “Information Security” is strongly recommended.

**Annotation**

Some lectures are in English, some in German.

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

**Human Factors in Security and Privacy**

2511554, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Literature**

- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
7.182 Course: Ignition Systems [T-MACH-105985]

**Responsible:** Dr.-Ing. Olaf Toedter

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

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<th>2 SWS</th>
<th>Lecture (V)</th>
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</table>

**Competence Certificate**

oral exam, 20 min

**Prerequisites**

none

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

**Ignition systems**

2133125, WS 20/21, 2 SWS, Language: German, Open in study portal

**Content**

- Ignition Process
- Spark Ignition
- Principle of Spark Ignition Systems
- Limits of Spark Ignition
- New Developments of Spark Ignition Systems
- New an Alternative Ignition Systems
7.183 Course: Incentives in Organizations [T-WIWI-105781]

**Responsible:** Prof. Dr. Petra Nieken

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

**Part of:**
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-101500 - Microeconomic Theory
- M-WIWI-101505 - Experimental Economics
- M-WIWI-101510 - Cross-Functional Management Accounting

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</table>

**Competence Certificate**

The assessment of this course is a written examination (60 min). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. In case of a small number of registrations, we might offer an oral exam instead of a written exam.

**Prerequisites**

None

**Recommendation**

Knowledge of microeconomics, game theory, and statistics is assumed.

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

**Incentives in Organizations**

2573003, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
Content
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Aim
The student
- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics.
- understands how econometric methods can be used to analyze performance and compensation data.
- knows incentive schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical data from companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Workload
The total workload for this course is: approximately 135 hours.
Lecture: 32 hours
Preparation of lecture: 52 hours
Exam preparation: 51 hours

Literature
Slides, Additional case studies and research papers will be announced in the lecture.
Literature (complementary):
Behavioral Game Theory, Camerer, Russel Sage Foundation, 2003
Introduction to Econometrics, Wooldridge, Andover, 2014
Econometric Analysis of Cross Section and Panel Data, Wooldridge, MIT Press, 2010
### 7.184 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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**Competence Certificate**  
Alternative exam assessment (written composition and speech)

**Prerequisites**  
None

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

**Information Engineering**  
2122014, SS 2020, 2 SWS, Language: German/English, [Open in study portal](#)

**Content**  
Seminar papers on current research topics of the Institute for Information Management in Engineering. The respective topics are presented at the beginning of each semester.

**Organizational issues**  
Siehe Homepage zur Lehrveranstaltung

**Literature**  
Themenspezifische Literatur
Course: Information Management for Public Mobility Services [T-BGU-106608]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

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

**Part of:**
- M-BGU-101064 - Fundamentals of Transportation
- M-BGU-101065 - Transportation Modelling and Traffic Management

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**Events**

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<td>Informationsmanagement für öffentliche Mobilitätsangebote</td>
<td>2 SWS</td>
<td>Block (B)</td>
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**Competence Certificate**

lecture accompanying exercises, appr. 5 pieces

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
7.186 Course: Information Service Engineering [T-WIWI-106423]

Responsible: Prof. Dr. Harald Sack
Organisation: KIT Department of Economics and Management

Part of:
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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Events

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<th>SS 2020</th>
<th>2511606</th>
<th>Information Service Engineering</th>
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<td>2511607</td>
<td>Exercises to Information Service Engineering</td>
<td>1 SWS</td>
<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 or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

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

Prerequisites

None

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

Information Service Engineering

2511606, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
Content
- Information, Natural Language and the Web
- Natural Language Processing
  - NLP and Basic Linguistic Knowledge
  - NLP Applications, Techniques & Challenges
  - Evaluation, Precision and Recall
  - Regular Expressions and Automata
  - Tokenization
  - Language Model and N-Grams
  - Part-of-Speech Tagging
- Knowledge Graphs
  - Knowledge Representations and Ontologies
  - Resource Description Framework (RDF) as simple Data Model
  - Creating new Models with RDFS
  - Querying RDF(S) with SPARQL
  - More Expressivity via Web Ontology Language (OWL)
  - From Linked Data to Knowledge Graphs
  - Wikipedia, DBpedia, and Wikidata
  - Knowledge Graph Programming
- Basic Machine Learning
  - Machine Learning Fundamentals
  - Evaluation and Generalization Problems
  - Linear Regression
  - Decision Trees
  - Unsupervised Learning
  - Neural Networks and Deep Learning
- ISE Applications
  - From Data to Knowledge
  - Data Mining, Information Visualization and Knowledge Discovery
  - Semantic Search
  - Exploratory Search
  - Semantic Recommender Systems

Learning objectives:
- The students know the fundamentals and measures of information theory and are able to apply those in the context of Information Service Engineering.
- The students have basic skills of natural language processing and are enabled to apply natural language processing technology to solve and evaluate simple text analysis tasks.
- The students have fundamental skills of knowledge representation with ontologies as well as basic knowledge of Semantic Web and Linked Data technologies. The students are able to apply these skills for simple representation and analysis tasks.
- The students have fundamental skills of information retrieval and are enabled to conduct and to evaluate simple information retrieval tasks.
- The students apply their skills of natural language processing, Linked Data engineering, and Information Retrieval to conduct and evaluate simple knowledge mining tasks.
- The students know the fundamentals of recommender systems as well as of semantic and exploratory search.

Literature
7.187 Course: Information Systems and Supply Chain Management [T-MACH-102128]

**Responsible:** Dr.-Ing. Christoph Kilger  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-MACH-101278 - Material Flow in Networked Logistic Systems  
M-MACH-104888 - Advanced Module Logistics

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<td>2118094</td>
<td></td>
<td>2 SWS Lecture (V) Kilger</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 related to this course:*

**Information Systems in Logistics and Supply Chain Management**

2118094, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Literature**

### Course: Infrastructure Management [T-BGU-106300]

**Responsible:** Prof. Dr.-Ing. Ralf Roos  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-100998 - Design, Construction, Operation and Maintenance of Highways  
M-BGU-100999 - Highway Engineering

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<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Roos</td>
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</table>

**Competence Certificate**  
written exam, 120 min.

**Prerequisites**  
none

**Recommendation**  
none

**Annotation**  
none
### 7.189 Course: Innovation Lab [T-ETIT-110291]

**Responsible:**
- Prof. Dr.-Ing. Sören Hohmann
- Prof. Dr.-Ing. Eric Sax
- Prof. Dr. Wilhelm Stork
- Prof. Dr.-Ing. Thomas Zwick

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

**Part of:**
- M-WIWI-105011 - Student Innovation Lab (SIL) 2

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<td>Project (PRO)</td>
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**Competence Certificate**
- see module description
7.190 Course: Innovation Management: Concepts, Strategies and Methods [T-WIWI-102893]

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

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

**Part of:**
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovation Management

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**Events**

| SS 2020 | 2545100 | Innovation Management: Concepts, Strategies and Methods | 2 SWS | Lecture (V) | Weissenberger-Eibl |

**Competence Certificate**
The assessment consists of a written exam (60 minutes). The exam takes place in every summer semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

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

**Innovation Management: Concepts, Strategies and Methods**

**2545100, SS 2020, 2 SWS, Language: German, Open in study portal**

**Lecture (V)**

**Content**
The course ‘Innovation Management: Concepts, Strategies and Methods’ offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application. The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which 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.

**Aim:**
Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

**Organizational issues**
Die Vorlesung wird bis auf Weiteres als interaktive online Veranstaltung durchgeführt. Die Vorlesung startet am 23.4. und findet donnerstags 09:45 - 11:15 statt. **Wichtig!** Bitte treten Sie dem ILIAS-Kurs zur Vorlesung bei, damit wir Ihnen weitere Informationen mitteilen können.

**Literature**
Eine ausführliche Literaturliste wird mit den Vorlesungsunterlagen zur Verfügung gestellt.

Course: Innovation Processes Live [T-WIWI-110234]

**Responsible:** Dr. Daniela Beyer

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

**Part of:** M-WIWI-101507 - Innovation Management

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**Competition Certificate**
Alternative exam assessments (§4(2), 3 SPO). The grade consists of an exposé (15%), a guideline interview or an analysis tool (25%), a group presentation of the results (20%) and a seminar paper (40%).

**Prerequisites**
None.

**Recommendation**
Prior attendance of the course Innovation Management [2545015] is recommended.
7.192 Course: Innovation Theory and Policy [T-WIWI-102840]

**Responsible:** Prof. Dr. Ingrid Ott
**Organisation:** KIT Department of Economics and Management
**Part of:**
- M-WIWI-101478 - Innovation and Growth
- M-WIWI-101497 - Agglomeration and Innovation
- M-WIWI-101514 - Innovation Economics

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**Events**

| SS 2020 | 2560236 | Innovation theory and policy | SWS     | Lecture (V) | Ott |
| SS 2020 | 2560237 | 1 SWS | Practice (Ü) | Ott, Eraydin |

**Competence Certificate**

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A bonus can be earned through a short written homework and its presentation in the exercise. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by a maximum of one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**

None

**Recommendation**

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

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

**Innovation theory and policy**

2560236, SS 2020, SWS, Language: German/English, [Open in study portal]
Content

Learning objectives:

Students shall be given the ability to

- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- understand the relationships between market structure and the development of innovation
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Course content:

The course covers the following topics:

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

Recommendations:

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

Workload:

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

Exam description:

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Literature

Auszug:

Course: Integrated Product Development [T-MACH-105401]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-102626 - Major Field: Integrated Product Development

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<td>Lecture (V)</td>
<td>Integrated Product Development</td>
<td>Albers</td>
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<td>WS 20/21 2145157</td>
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<td>Practice (Ü)</td>
<td>Workshop Product Development</td>
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<td>2 SWS</td>
<td>Others (sonst.)</td>
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<td>Albers</td>
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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 related to this course:*

### Integrated Product Development

2145156, WS 20/21, 4 SWS, Language: German, Open in study portal
Content
Registration required in the previous summer semester. The lecture starts in first week of October.

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

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

The rule here is:

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

Recommendations:
none

Workload:
regular attendance: 84 h
self-study: 288 h

Examination:
oral examination (60 minutes)
combined examination of lectures, tutorials and project work

Course content:
organizational integration: integrated product engineering model, core team management and simultaneous engineering informational integration: innovation management, cost management, quality management and knowledge management personal integration: team coaching and leadership management invited lectures

Learning objectives:
The Students are able to ...

- analyze and evaluate product development processes based on examples and their own experiences.
- plan, control and evaluate the working process systematically.
- choose and use suitable methods of product development, system analysis and innovation management under consideration of the particular situation.
- prove their results.
- develop complex technical solutions in a team and to present them to qualified persons as well as non-qualified persons
- to design overall product development processes under consideration of market-, customer- and company- aspects

Literature
Klaus Ehrlenspiel - Integrierte Produktentwicklung. Denkabläufe, Methodeneinsatz, Zusammenarbeit, Hanser Verlag, 2009

Workshop Product Development
2145157, WS 20/21, 4 SWS, Language: German, Open in study portal
Content
Prerequisites:
The participation in "Integrated Product Development" requires the concurrent participation in lectures (2145156), tutorials (2145157) and project work (2145300).

Due to organizational reasons, the number of participants is limited to 42 persons. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK homepage from April to July. The selection itself is made by Prof. Albers in personal interviews.

Recommendations:
none

Workload:
regular attendance: 84 h
self-study: 288 h

Examination:
lectures: 21 h
preparation to exam: 99 h

Course content:
problem solving: analysis techniques, creativity techniques and evaluation methods
professional skills: presentation techniques, moderation and teamcoaching
development tools: MS Project, Szenario-Manager & Pro/Engineer Wildfire

Learning objectives:
The theoretical background taught in the lecture, is deepened through methodworkshops, business games and case studies. The reflexion of the oneself procedure allows for an applicability and practicability of the contents in the accompanying development project as well as for the career entry.

Literature
Klaus Ehrlenspiel - Integrierte Produktentwicklung. Denkabläufe, Methodeneinsatz, Zusammenarbeit, Hanser Verlag, 2009
Content
Participation only possible in combination with the lecture 2145156 'Integrated Product Development'.

Prerequisites:
The participation in "Integrated Product Development" requires the concurrent participation in lectures (2145156), tutorials (2145157) and project work (2145300).

Due to organizational reasons, the number of participants is limited to 42 persons. Thus a selection has to be made. For registration to the selection process a standard form has to be used, that can be downloaded from IPEK homepage from april to july. The selection itself is made by Prof. Albers in personal interviews.

Recommendations:
none

Workload:
regular attendance: 21 h
self-study: 99 h

Examination:
oral examination (60 minutes)
combined examination of lectures, tutorials and project work

Course content:
The project work begins with the early stages of product development, i.e. the identification of market trends and needs. Based on this information the students develop scenarios for future markets and create product profiles, which describe the customers and their demands without anticipating possible product solutions. After having passed several following milestones for ideas, concepts and designs, virtual prototypes and function prototypes are presented to an audience.
The project work is supported by coaching through skilled faculty staff. Additionally weekly tutorials, respectively workshops are given. For doing the project the teams gain access to team workspaces featuring IT-infrastructure and relevant software, such as office, CAD or FEA. Further on the teams learn how team cooperation and knowledge management can be supported in design project by using a wiki system.s

Learning objectives:
The center of "Integrated Product Development" constitutes itself in the development of a technical product within independent working student teams on the basis of the market situation up to virtual and real prototypes. Thereby the integrate treatment of the product development process is of importance. The project teams hereby represent development departments of medium sized companies, in which the presented methods and tools are field - experienced applied and ideas are transformed into concrete product models.
For the preparation of this development project the basics of 3D-CAD-modelling (Pro/ENGINEER) as well as different tools and methods of creative designing, of sketching and solution finding are mediated in workshops. Special events impart an insight of presentation techniques and the meaning of technical design.
Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-109054]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101272 - Integrated Production Planning

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<td>Each summer term</td>
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**Events**

| SS 2020 | 2150660 | Integrated Production Planning in the Age of Industry 4.0 | 6 SWS | Lecture / Practice (VÜ) | Lanza |

**Competence Certificate**

Written Exam (120 min)

**Prerequisites**

"T-MACH-108849 - Integrierte Produktionsplanung im Zeitalter von Industrie 4.0" as well as "T-MACH-102106 Integrierte Produktionsplanung" must not be commenced.

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

**Integrated Production Planning in the Age of Industry 4.0**

2150660, SS 2020, 6 SWS, Language: German, [Open in study portal](#)
Content
Integrated production planning in the age of industry 4.0 will be taught in the context of this engineering science lecture. In addition to a comprehensive introduction to Industry 4.0, the following topics will be addressed at the beginning of the lecture:

- Basics, history and temporal development of production
- Integrated production planning and integrated digital engineering
- Principles of integrated production systems and further development with Industry 4.0

Building on this, the phases of integrated production planning are taught in accordance with VDI Guideline 5200, whereby special features of parts production and assembly are dealt with in the context of case studies:

- Factory planning system
- Definition of objectives
- Data collection and analysis
- Concept planning (structural development, structural dimensioning and rough layout)
- Detailed planning (production planning and control, fine layout, IT systems in an industry 4.0 factory)
- Preparation and monitoring of implementation
- Start-up and series support

The lecture contents are rounded off by numerous current practical examples with a strong industry 4.0 reference. Within the exercises the lecture contents are deepened and applied to specific problems and tasks.

Learning Outcomes:
The students ...

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

Workload:
MACH:
regular attendance: 63 hours
self-study: 177 hours

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

Organizational issues
Start: 21.04.2020
Vorlesungstermine dienstags 14.00 Uhr und donnerstags 14.00 Uhr, Übungstermine donnerstags 15.45 Uhr. Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).
7.195 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

**Responsible:** Dr. Karl-Hubert Schlichtenmayer  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:**  
M-MACH-101284 - Specialization in Production Engineering  
M-MACH-105455 - Strategic Design of Modern Production Systems

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<td>SS 2020 2150601</td>
<td>Integrative Strategies in Production and Development of High Performance Cars</td>
<td>2 SWS</td>
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<td>Schlichtenmayer</td>
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<td>Integrative Strategies in Production and Development of High Performance Cars</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Schlichtenmayer</td>
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**Competence Certificate**  
Written Exam (60 min)

**Prerequisites**  
none

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

**Integrative Strategies in Production and Development of High Performance Cars**  
2150601, SS 2020, 2 SWS, Language: German, [Open in study portal](#)
Content
The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:
- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrative R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Learning Outcomes:
The students ...
- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Workload:
regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 21.04.2020

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).
Content
The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:

- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrative R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Learning Outcomes:
The students ...

- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Workload:
regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Die LV wurde wegen der Coronapandemie vom SS 20 ins WS 20/21 verschoben.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).
Course: Intelligent Agents and Decision Theory [T-WIWI-110915]

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

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

**Part of:** M-WIWI-101470 - Data Science: Advanced CRM

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<th>Lecture (V)</th>
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<td>2540538</td>
<td>Übung zu Intelligent Agents and Decision Theory</td>
<td>SWS</td>
<td>Practice (Ü)</td>
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</table>

**Competence Certificate**

Oral (30 minutes) or written examination (60 minutes). The exam is held in each semester and can be repeated at any regular examination date. Details of the grading system and any exam bonus that may be achieved from the practice are announced in the course.

**Prerequisites**

None

**Recommendation**

We assume knowledge in statistics, operations research and microeconomics as taught in the Bachelor program (VWL I, Operations Research I + II, Statistics I + II) and a familiarity with preferably the Python programming language.

**Annotation**

new lecture starting summer semester 2020

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

**Intelligent Agents and Decision Theory**

2540537, SS 2020, SWS, Language: English, [Open in study portal](#)
Content
The key assumption of this lecture is that the concept of artificial intelligence is inseparably linked to the economic concept of rationality of agents. We consider different classes of decision problems - decisions under certainty, risk and uncertainty - from an economic, managerial and AI-engineering perspective:

From an economic point of view, we analyze how to act rationally in these situations based on classic utility theory. In this regard, the course also introduces the relevant parts of decision theory for dealing with

- multiple conflicting objectives,
- incomplete, risky and uncertain information about the world,
- assessing utility functions, and
- quantifying the value of information ...

From an engineering perspective, we discuss how to develop practical solutions for these decision problems, using appropriate AI components. We introduce

- a general, agent-based design framework for AI systems,

as well as AI methods from the fields of

- search (for decisions under certainty),
- inference (for decisions under risk) and
- learning (for decisions under uncertainty).

Where applicable, the course highlights the theoretical ties of these methods with decision theory.

We conclude with a discussion of ethical and philosophical issues concerning the development and use of AI.

Learning objectives
Students are able to design, analyze, implement, and evaluate intelligent agents.

Lecture Outline
1. Introduction: Artificial intelligence and the economic concept of rationality
2. Intelligent Agents: A general, agent-based design framework for AI systems
3. Decision under certainty: Assessing utility functions for decisions with multiple objectives
4. Search: Linear programming for decisions under certainty
5. Decisions under risk: The expected utility principle
6. Information systems: Improving economic decisions under risk
7. Inference: Bayesian networks for decisions under risk
8. Information Learning objectives value: When should an agent gather new information?
9. Decisions under uncertainty: Complete lack of information
10. Learning: Statistical learning of bayesian networks
11. Learning: Supervised learning with neural networks
12. Learning: Reinforcement learning
13. Learning: Preference-based reinforcement learning
14. Discussion: Ethical and philosophical issues

Note: This rough outline may be subject to change.
Literature

Basic literature (by lecture):

1. Russell & Norvig (2016, chapter 1), Bamberg et al. (2019, chapters 1 & 2)
2. Russell & Norvig (2016, chapter 2)
4. Nickel et al. (2014, chapter 1) [German], Russell & Norvig (2016, chapter 3)
6. Bamberg et al. (2019, chapter 6)
7. Russell & Norvig (2016, chapters 13, 14, 16)
8. Russell & Norvig (2016, chapter 16), Bamberg et al. (2019, chapter 6)
9. Bamberg et al. (2019, chapter 5)
10. Russell & Norvig (2016, chapter 20)
11. Goodfellow et al. (2016, chapter 6)
13. Wirth et al. (2017)

Detailed references:
7.197 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>2540526</td>
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Competence Certificate

This lecture will be offered for the last time in winter semester 2019/20.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
It is recommended to additionally review the Bachelor-level lecture “Customer Relationship Management“ from the module “CRM and Servicemanagement“.

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

Intelligent Agent Architectures
2540525, WS 20/21, 2 SWS, Language: English, Open in study portal
Content

Course content:
The lecture is structured in three parts:

In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload:
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance
- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Learning Goals:
Students have special knowledge of software architectures and of the methods which are used in their development (Systems analysis, formal methods for the specification of interfaces and algebraic semantic, UML, and, last but not least, the mapping of conceptual architectures to IT architectures.

Students know important architectural patterns and they can – based on their CRM knowledge – combine these patterns for innovative CRM applications.

Assessment:
The assessment consists of a written exam of 1-hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from exercise work will be added.

Grade: Minimum points
- 1.0: 95
- 1.3: 90
- 1.7: 85
- 2.0: 80
- 2.3: 75
- 2.7: 70
- 3.0: 65
- 3.3: 60
- 3.7: 55
- 4.0: 50
- 5.0: 0

The grade consists of approximately 91% of exam points and 9% of exercise points.

Literature
7 COURSES

Course: International Business Development and Sales [T-WIWI-110985]

7.198 Course: International Business Development and Sales [T-WIWI-110985]

Responsible: Erice Casenave
Prof. Dr. Martin Klarmann
Prof. Dr. Orestis Terzidis

Organisation: KIT Department of Economics and Management

Part of:
  M-WIWI-101488 - Entrepreneurship (EnTechnon)
  M-WIWI-101488 - Entrepreneurship (EnTechnon)
  M-WIWI-105312 - Marketing and Sales Management

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Events

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Competence Certificate

Non exam assessment. The grade is based on the presentation, the subsequent discussion and the written elaboration.

Annotation

Due to the Corona situation it is currently unclear whether the seminar can be offered in WS20 / 21.

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

Content

This course is offered as part of the EUCOR programme in cooperation with EM Strasbourg. Max. 10 students of KIT and max. 10 students of EM Strasbourg will develop a sales presentation in tandems (teams of 2). This is based on the value proposition of a business model.

- An application is required to participate in this event. The application phase usually takes place at the beginning of the lecture period. Further information on the application process can be found on the website of the Marketing and Sales Research Group (marketing.ism.kit.edu) shortly before the start of the lecture period.

Total workload for 6 ECTS: about 180 hours.
# 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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## Competence Certificate
See German version.

## Prerequisites
None

## Recommendation
None

## Annotation
The course will not be offered in the summer semester 2020 as originally planned, but only in the winter semester 2020/2021. The course is offered as a 14-day or block course.

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

### International Finance
2530570, SS 2020, 2 SWS, Language: German, Open in study portal

**Organizational issues**  
Diese Veranstaltung findet im WS 20/21 statt.

**Literature**  
Weiterführende Literatur:


### International Finance
2530570, WS 20/21, 2 SWS, Language: German, Open in study portal

**Organizational issues**  
Blockveranstaltung

am 11.11.20 15:45-19:00 Uhr Seminarraum 124 Geb. 09.21

**Literature**  
Weiterführende Literatur:

Course: International Management in Engineering and Production [T-WIWI-102882]

**Responsible:** Dr. Henning Sasse

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

**Part of:**
- M-WIWI-101412 - Industrial Production III
- M-WIWI-101471 - Industrial Production II

**Type**  
Written examination

**Credits**  
3.5

**Recurrence**  
Each winter term

**Version**  
1

**Events**

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<td>2581956</td>
<td>International Management in Engineering and Production</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 related to this course:

**International Management in Engineering and Production**
2581956, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

**Content**
- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

**Organizational issues**
Blockveranstaltung
Im Seminarraum-West beim IIP, Termine siehe Institutshomepage

**Literature**
Wird in der Veranstaltung bekannt gegeben.
7.201 Course: International Selling – EUCOR [T-WIWI-110381]

Responsible: Erice Casenave
Prof. Dr. Martin Klarmann

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101488 - Entrepreneurship (EnTechnon)

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Competence Certificate
Non exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation (presentation). The grade is based on the presentation and the subsequent discussion.

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

Annotation
An application is required to participate in this course. The application phase usually takes place at the beginning of the lecture period. Further information on the application process can be found on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the start of the lecture period.
Please note that the courses "Business Planning for Founders - EUCOR" (3 ECTS) and "International Selling - EUCOR" (3 ECTS) can only be taken together (6 ECTS in total).
7.202 Course: Internet Law [T-INFO-101307]

- **Responsible:** Prof. Dr. Thomas Dreier
- **Organisation:** KIT Department of Informatics
- **Part of:** M-INFO-101215 - Intellectual Property Law
  M-INFO-101242 - Governance, Risk & Compliance

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</table>
Course: Introduction to Bayesian Statistics for Analyzing Data [T-WIWI-110918]

Responsible: Prof. Dr. Benjamin Scheibehenne
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems

Events
| SS 2020 | 2572175 | Introduction to Bayesian Statistics for Analyzing Data | 2 SWS | Lecture (V) | Scheibehenne |

Competence Certificate
Grades will be based on active participation (50%) and homework assignments (50%).

Prerequisites
Participants should already have a basic knowledge of R and standard frequentist statistical tests. Please bring your own Laptop with you as we will be using R for several hands-on examples and exercises during the class. We will mainly work with the book "Statistical Rethinking. A Bayesian Course with Examples in R and Stan" by Richard McElrath. Students are advised to obtain the book before the class starts.

Annotation
Due to its interactive nature, participation will be limited to 10 students. If you want to participate, please send a short email to scheibehenne@kit.edu until Thursday, the 23rd of April in which you outline why you are interested in this class and what your expectations are.

The class will consist of three day-long sessions from 9:00 (s.t.) to 18:00. The first session will be held on Thursday, the 7th of May 2020. The second session will be on Thursday, the 28th of May. The third session will be on Thursday, the 18th of June. The classroom will be communicated to registered students in advance. In case classrooms will be closed due to the Corona virus, the class will be taught online and the schedule will be adapted.

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

Introduction to Bayesian Statistics for Analyzing Data
2572175, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)
Content

Goal
The goal of this class is to introduce Bayesian statistics as a viable alternative to conventional Null-Hypothesis significance testing (NHST) and the calculation of p-values. The class introduces the theoretical background of Bayesian statistics and its advantages over NHST. Based on this, students will work through hands-on approaches for analyzing various empirical data using Bayesian statistics. These analyses will mainly be conducted with the statistics software R and JASP. The class provides participants with the necessary skills to evaluate and interpret the results of published Bayesian analyses and to use the method for testing hypotheses and estimating model parameters based on empirical data. There will be regular reading and homework assignments.

Requirements
Participants should already have a basic knowledge of R and standard frequentist statistical tests. Please bring your own Laptop with you as we will be using R for several hands-on examples and exercises during the class. We will mainly work with the book “Statistical Rethinking. A Bayesian Course with Examples in R and Stan” by Richard McElrath. Students are advised to obtain the book before the class starts.

Schedule
The class will consist of three day-long sessions from 9:00 (s.t.) to 18:00. The first session will be held on Thursday, the 7th of May 2020. The second session will be on Thursday, the 28th of May. The third session will be on Thursday, the 18th of June. The classroom will be communicated to registered students in advance. In case classrooms will be closed due to the Corona virus, the class will be taught online and the schedule will be adapted.

Grading
Grades will be based on active participation (50%) and homework assignments (50%).

Registration and number of participants
Due to its interactive nature, participation will be limited to 10 students. If you want to participate, please send a short email to scheibehenne@kit.edu until Thursday, the 23rd of April in which you outline why you are interested in this class and what your expectations are.

Literature
7.204 Course: Introduction to Ceramics [T-MACH-100287]

Responsibility: Prof. Dr. Michael Hoffmann

Organisation: KIT Department of Mechanical Engineering

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

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Events

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<td>Introduction to Ceramics</td>
<td>3 SWS</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 related to this course:

Introduction to Ceramics
2125757, WS 20/21, 3 SWS, Language: German, Open in study portal

Organizational issues
Die Veranstaltung findet in den angegebenen Räumen oder online statt.

Literature
- Kingery, Bowen, Uhlmann, “Introduction To Ceramics”, Wiley
- Y.-M. Chiang, D. Birnie III and W.D. Kingery, “Physical Ceramics”, Wiley
**Course: Introduction to Data Science [T-WIWI-110863]**

**Responsibility:** PD Dr. Steffen Herbold

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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**Events**

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<th>SWS</th>
<th>Type</th>
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<tbody>
<tr>
<td>SS 2020</td>
<td>2511608</td>
<td>Introduction to Data Science</td>
<td>2</td>
<td>Lecture (V)</td>
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<tr>
<td>SS 2020</td>
<td>2511609</td>
<td>Exercises to Introduction to Data Science</td>
<td>1</td>
<td>Practice (Ü)</td>
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</table>

**Competence Certificate**

The assessment consists of a written exam (60 min).

Please note that lecture and exam will be offered once in the summer semester 2020. The repeat examination will take place in winter semester 2020/21 (only for repeaters).

**Prerequisites**

None

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

**Introduction to Data Science**

2511608, SS 2020, 2 SWS, Language: English, [Open in study portal]

**Lecture (V)**

**Content**

The main topic of this lecture is data science, i.e., methods to extract information from data with a scientific approach. We approach this topic from a practical side in this lecture. This means, that we concern ourselves directly with what algorithms do, and where they should be applied. The details of the algorithms and the theory behind them are not part of this lecture. Methods considered in this lecture include:

- Association rule mining with the APRIORI approach
- Clustering with k-means, EM for gaussian mixtures, DBSCAN, and single linkage clustering
- Classification with k-nearest neighbor, decision trees, random forests, logistic regression, naive Bayes, support vector machines, and neural networks
- Linear regression with ridge and lasso
- Time series analysis with ARMA
- Fundamentals of text mining

Additionally, we will consider the analysis of Big Data. In this context, we will consider the following topics:

- The MapReduce paradigm
- Apache Hadoop and Apache Spark

**Literature**

To be announced.
Course: Introduction to Hydrogeology [T-BGU-101499]

**Responsible:** Prof. Dr. Nico Goldscheider

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

**Part of:** M-WIWI-104837 - Natural Hazards and Risk Management

**Type**
Written examination

**Credits**
5

**Recurrence**
Each winter term

**Version**
1

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<tr>
<td>WS 20/21</td>
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<td>Each winter term</td>
<td>Written examination</td>
<td>KIT Department of Civil Engineering, Geo- and Environmental Sciences</td>
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</tbody>
</table>

**Competence Certificate**
Written exam with 90 minutes

**Prerequisites**
none
7.207 Course: Introduction to Microsystem Technology I [T-MACH-105182]

Responsible: Dr. Vlad Badilita
Dr. Mazin Jouda
Prof. Dr. Jan Gerrit Korvink

Organisation: KIT Department of Mechanical Engineering

Part of: M-ETIT-101158 - Sensor Technology I
M-MACH-101287 - Microsystem Technology

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Events

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<tr>
<td>WS 20/21</td>
<td>2141861</td>
<td>Introduction to Microsystem Technology I</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
</tr>
</tbody>
</table>

Competence Certificate
written examination (60 min)

Prerequisites
none

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

**Introduction to Microsystem Technology I**
2141861, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

Lecture (V)

Literature
Mikrosystemtechnik für Ingenieure, W. Menz und J. Mohr, VCH Verlagsgesellschaft, Weinheim 2005
M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011
Course: Introduction to Microsystem Technology II [T-MACH-105183]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-ETIT-101158 - Sensor Technology I  
M-MACH-101287 - Microsystem Technology

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**Events**

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<th>2142874</th>
<th>Introduction to Microsystem Technology II</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Korvink, Badilita</th>
</tr>
</thead>
</table>

**Competence Certificate**

written examination (60 min)

**Prerequisites**

none

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

**Introduction to Microsystem Technology II**

2142874, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Content**

- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patternning with lasers
- Assembly and packaging
- Microsystems

**Literature**

Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

M. Madou

Fundamentals of Microfabrication

Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011
7.209 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102832 - Operations Research in Supply Chain Management
         M-WIWI-103289 - Stochastic Optimization

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<td>Practice (Ü)</td>
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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.
### 7.210 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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<td>WS 20/21</td>
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<td>3 SWS</td>
<td>Project (PRO)</td>
<td>Ovtcharova, Maier</td>
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</table>

**competence Certificate**  
Assessment of another type (graded), procedure see webpage. Number of participants limited to 20 people. There is a participant selection process.

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

#### IoT platform for engineering

**2123352, SS 2020, 3 SWS, Language: German, Open in study portal**

**Project (PRO)**

**Content**  
Industry 4.0, IT systems for fabrication and assembly, process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- map and analyze processes in the context of Industry 4.0 with special methods of process modelling  
- collaboratively grasp practical I4.0 issues using existing hardware and software and work out solutions for a continuous improvement process in a team  
- prototypically implement the self-developed solution proposal with the given IT systems and the existing hardware equipment and finally present the results

**Organizational issues**  
Siehe Homepage zur Lehrveranstaltung

**Literature**  
Keine / None

#### IoT platform for engineering

**2123352, WS 20/21, SWS, Language: German, Open in study portal**

**Project (PRO)**

**Content**  
Industry 4.0, IT systems for fabrication and assembly, process modelling and execution, project work in teams, practice-relevant I4.0 problems, in automation, manufacturing industry and service.

Students can

- map and analyze processes in the context of Industry 4.0 with special methods of process modelling  
- collaboratively grasp practical I4.0 issues using existing hardware and software and work out solutions for a continuous improvement process in a team  
- prototypically implement the self-developed solution proposal with the given IT systems and the existing hardware equipment and finally present the results
Organizational issues
Veranstaltungsort: CAIT am IMI in der Kriegsstraße 77. Zeit siehe ILIAS zur Lehrveranstaltung.

Literature
Keine / None
7 COURSES

Course: IT- Security Law [T-INFO-109910]

7.211 Course: IT- Security Law [T-INFO-109910]

Responsible: apl. Prof. Dr. Oliver Raabe
Organisation: KIT Department of Informatics
Part of: M-INFO-101242 - Governance, Risk & Compliance

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7.212 Course: IT-Based Road Design [T-BGU-101804]

**Responsible:** Dr.-Ing. Matthias Zimmermann

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

**Part of:** M-BGU-101066 - Safety, Computing and Law in Highway Engineering

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<td>DV-gestützter Straßenentwurf</td>
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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
7.213 Course: IT-Fundamentals of Logistics [T-MACH-105187]

**Responsible:** Prof. Dr.-Ing. Frank Thomas

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101278 - Material Flow in Networked Logistic Systems
M-MACH-104888 - Advanced Module Logistics

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<td>3</td>
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<td>2118184</td>
<td>IT-Fundamentals of Logistics: Opportunities for Digital Transformation</td>
<td>2 SWS</td>
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**Competence Certificate**
The assessment consists of an oral exam (30min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

**Prerequisites**
none

**Annotation**
1) Detailed script can be downloaded online (www.tup.com), updated and enhanced annually.
2) CD-ROM with chapters and exercises at the end of the semester available from the lecturer, also updated and enhanced annually.

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

**IT-Fundamentals of Logistics: Opportunities for Digital Transformation**
2118184, SS 2020, 2 SWS, Language: German, [Open in study portal](#)
7.214 Course: Joint Entrepreneurship Summer School [T-WIWI-109064]

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

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

**Part of:** M-WIWI-101488 - Entrepreneurship (EnTechnon)

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<th>Joint Entrepreneurship School</th>
<th>SWS</th>
<th>Seminar (S)</th>
<th>Terzidis, Ntagiakou, Kleinn</th>
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</table>

**Competence Certificate**
The learning control of the program (Summer School) consists of two parts:

A) **Investor Pitch:**
Based on a presentation (investor pitch) in front of a jury, the insights gained and developed during the course of the event are presented and the business idea presented. Among other things, the presentation performance of the team, the structured content and the logical consistency of the business idea are evaluated. The exact evaluation criteria will be announced in the course.

B) **Written elaboration:**
The second part of the assessment is a written report. The iterative knowledge gain of the entire event is systematically logged and can be further supplemented by the contents of the presentation. The report documents key action steps, applied methods, findings, market analyzes and interviews and prepares them in writing. The exact structure and requirements will be announced in the course.

The grade consists of 50% presentation performance and 50% written preparation.

**Prerequisites**
The Summer School is aimed at master students of KIT. Prerequisite is the participation in the selection process.

**Recommendation**
We recommend basic business knowledge, the lecture Entrepreneurship as well as openness and interest in intercultural exchange. Solid knowledge of the English language is an advantage.

**Annotation**
The working language during the Summer School is English. A one-week stay in China is part of the Summer School.
7.215 Course: Judgment and Decision Making [T-WIWI-111099]

**Responsible:** Prof. Dr. Benjamin Scheibehenne

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

**Part of:** M-WIWI-105312 - Marketing and Sales Management

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<td>Once</td>
<td>1 terms</td>
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**Competence Certificate**

The grade will be based on the written exam (60 minutes) at the end of the semester.
Course: KD²Lab Hands-On Research Course: New Ways and Tools in Experimental Economics [T-WIWI-111109]

<table>
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<th>Prof. Dr. Christof Weinhardt</th>
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<tr>
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<td>M-WIWI-101446 - Market Engineering</td>
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<td>M-WIWI-103118 - Data Science: Data-Driven User Modeling</td>
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<td>M-WIWI-104080 - Designing Interactive Information Systems</td>
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<td>Recurrence</td>
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<tr>
<td>Expansion</td>
<td>1 terms</td>
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<tr>
<td>Version</td>
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</table>

**Competence Certificate**

Non exam assessment. Grading will be based on a continuous basis throughout the semester. The assessment consists of:

- A written paper, and
- a group presentation with subsequent discussion and question and answer session of 30 minutes.

For particularly active and constructive participation in the discussions of other papers during the final presentation, a bonus of one grade level (0.3 or 0.4) can be achieved on the passed exam. Details on the grading will be announced at the beginning of the event.

**Annotation**

Due to the laboratory capacity and in order to ensure an optimal supervision of the project groups, the number of participants is limited. Places are allocated according to preferences and suitability for the topics. In particular, previous knowledge in the field of experimental economics plays a role.

The course will be offered starting in the summer semester 2021.
Course: Knowledge Discovery [T-WIWI-102666]

**Responsibility:** Prof. Dr. York Sure-Vetter

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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<td>Each winter term</td>
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**Events**

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<td>WS 20/21</td>
<td>2511302</td>
<td>Knowledge Discovery</td>
<td>2 SWS</td>
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<td>Lecture (V)</td>
<td>4.5</td>
<td>Sure-Vetter, Färber</td>
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<td>2511303</td>
<td>Exercises to Knowledge Discovery</td>
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<td>Practice (Ü)</td>
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<td>Sure-Vetter, Färber, Saier</td>
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</table>

**Competence Certificate**

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation. Students can be awarded a bonus on their final grade if they successfully complete special assignments.

**Prerequisites**

None

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

**Knowledge Discovery**

2511302, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

**Content**

The lecture gives an overview of approaches of machine learning and data mining for knowledge acquisition from large data sets. These are examined especially with respect to algorithms, applicability to different data representations and the use in real application scenarios.

Knowledge Discovery is an established research area with a large community that investigates methods for discovering patterns and regularities in large amounts of data, including unstructured text. A variety of methods exist to extract patterns and provide previously unknown insights. This information can be predictive or descriptive.

The lecture gives an overview of Knowledge Discovery. Specific techniques and methods, challenges and current and future research topics in this research area will be taught.

Contents of the lecture cover the entire machine learning and data mining process with topics on supervised and unsupervised learning and empirical evaluation. Covered learning methods range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

**Learning objectives:**

Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

**Workload:**

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 60 hours
- Exam and exam preparation: 30 hours
Content
The exercises are based on the lecture Knowledge Discovery. Several exercises are covered, which take up and discuss in detail the topics covered in the lecture Knowledge Discovery. Practical examples are demonstrated to the students to enable a knowledge transfer of the theoretical aspects learned into practical application.

Contents of the lecture cover the entire machine learning and data mining process with topics on monitored and unsupervised learning processes and empirical evaluation. The learning methods covered range from classical approaches like decision trees, support vector machines and neural networks to selected approaches from current research. Learning problems considered include feature vector-based learning and text mining.

Learning objectives:
Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Literature

- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley
7.218 Course: Laboratory Laser Materials Processing [T-MACH-102154]

**Responsible:** Dr.-Ing. Johannes Schneider  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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**Events**

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<td>SS 2020</td>
<td>2183640</td>
<td>Laboratory &quot;Laser Materials Processing&quot;</td>
<td>3</td>
<td>Practical course (P)</td>
<td>Schneider, Pfleging</td>
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<tr>
<td>WS 20/21</td>
<td>2183640</td>
<td>Laboratory &quot;Laser Materials Processing&quot;</td>
<td>3</td>
<td>Practical course (P)</td>
<td>Schneider, Pfleging</td>
</tr>
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</table>

**Competence Certificate**

The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

**Prerequisites**

None

**Recommendation**

Basic knowledge of physics, chemistry and material science is assumed.

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

**Laboratory "Laser Materials Processing"**

2183640, SS 2020, 3 SWS, Language: German, [Open in study portal]  
Practical course (P)
Content
The laboratory compromises 8 half-day experiments, which address the following laser processing topics of metals, ceramics and polymers:

- safety aspects
- surface hardening and remelting
- melt and reactive cutting
- surface modification by dispersing or alloying
- welding
- surface texturing
- metrology

There are used CO₂-, excimer-, Nd:YAG- and high power diode-laser sources within the laboratory.

The student can describe the influence of laser, material and process parameters and can choose suitable parameters for the most important methods of laser-based processing in automotive engineering.

- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

The attendance to one of the courses Physical Basics of Laser Technology (2181612) or Laser Application in Automotive Engineering (2182642) is strongly recommended.

Regular attendance: 34 hours
Self-study: 86 hours

The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

Organizational issues
Das Praktikum kann nicht wie geplant stattfinden!
Falls es die Umstände erlauben, wird eine Alternativlösung angeboten. Die Praktikanten*innen werden direkt informiert!
Anmeldung per Email an johannes.schneider@kit.edu

Das Praktikum findet mittwochs in 2 Gruppen von 8:45 bis 11:45 Uhr bzw. von 14:15 bis 17:15 Uhr am IAM-CMS (CS) bzw. IAM-AWP (CN) statt!
Termine: 06.05.2020, 13.05.2020, 20.05.2020, 27.05.2020, 10.06.2020, 17.06.2020, 24.06.2020, 01.07.2020, 08.07.2020

Literature
R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer
Content
The laboratory compromises 8 half-day experiments, which address the following laser processing topics of metals, ceramics and polymers:

- safety aspects
- surface hardening and remelting
- melt and reactive cutting
- surface modification by dispersing or alloying
- welding
- surface texturing
- metrology

There are used CO2-, excimer-, Nd:YAG- and high power diode-laser sources within the laboratory.

The student

- can describe the influence of laser, material and process parameters and can choose suitable parameters for the most important methods of laser-based processing in automotive engineering.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

The attendance to one of the courses Physical Basics of Laser Technology (2181612) or Laser Application in Automotive Engineering (2182642) is strongly recommended.

regular attendance: 34 hours
self-study: 86 hours

The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

Organizational issues
Maximal 12 Teilnehmer/innen!
Aktuell sind bereit alle Plätze vergeben! Registrierung für Nachrückliste möglich per Email an johannes.schneider@kit.edu
Praktikum findet in 2 Gruppen semesterbegleitend mittwochs (8:00-11:00 bzw. 14:00-17:00) auf dem Campus Nord am IAM-AWP (Geb. 681) und auf dem Campus Süd am IAM-CMS (Geb. 30.48) statt!

Literature
R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer
7.219 Course: Laboratory Production Metrology [T-MACH-108878]

**Responsible:** Dr.-Ing. Benjamin Häfner  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101284 - Specialization in Production Engineering

<table>
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**Events**

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<td>2150550</td>
<td>Laboratory Production Metrology</td>
<td>3 SWS</td>
<td>Practical course (P)</td>
<td>Häfner</td>
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**Competence Certificate**
Alternative Test Achievement: Group presentation of 15 min at the beginning of each experiment and evaluation of the participation during the experiments and Oral Exam (15 min)

**Prerequisites**
none

**Annotation**
For organizational reasons the number of participants for the course is limited. Hence an selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

*Below you will find excerpts from events related to this course:*
Content
During this course, students get to know measurement systems that are used in a production system. In the age of Industry 4.0, sensors are becoming more important. Therefore, the application of in-line measurement technology such as machine vision and non-destructive testing is focussed. Additionally, laboratory based measurement technologies such as computed tomography are addressed. The students learn the theoretical background as well as practical applications for industrial examples. The students use sensors by themselves during the course. Additionally, they are trained on how to integrate sensors in production processes and how to analyze measurement data with suitable software.

The following topics are addressed:

- Classification and examples for different measurement technologies in a production environment
- Machine vision with optical sensors
- Information fusion based on optical measurements
- Robot-based optical measurements
- Non-destructive testing by means of acoustic measurements
- Coordinate measurement technology
- Industrial computed tomography
- Measurement uncertainty evaluation
- Analysis of production data by means of data mining

Learning Outcomes:
The students ...

- are able to name, describe and mark out different measurement technologies that are relevant in a production environment.
- are able to conduct measurements with the presented in-line and laboratory based measurement systems.
- are able to analyze measurement results and assess the measurement uncertainty of these.
- are able to deduce whether a work piece fulfills quality relevant specifications by analysing measurement results.
- are able to use the presented measurement technologies for a new task.

Workload:
regular attendance: 31.5 hours
self-study: 88.5 hours

Organizational issues
Die Lehrveranstaltung findet stets dienstags nachmittags statt.

The course always takes place on Tuesdays in the afternoon.

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).

Literature

Lecture notes will be provided in Illias (https://ilias.studium.kit.edu/). Additional reference to literature will be provided, as well.
7.220 Course: Laboratory Work Water Chemistry [T-CIWVT-103351]

**Responsible:**
Dr. Gudrun Abbt-Braun  
Prof. Dr. Harald Horn

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

**Part of:**
M-CIWVT-101121 - Water Chemistry and Water Technology I

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**Events**

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<td>22664</td>
<td>Practical Course in Water Technology</td>
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<td>Practical course (P)</td>
<td>Horn, Abbt-Braun, und Mitarbeiter</td>
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</table>

**Prerequisites**

none
7.221 Course: Large-scale Optimization [T-WIWI-106549]

**Responsible:** Prof. Dr. Steffen Rebennack

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

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<td>Each summer term</td>
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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.
Course: Laser in Automotive Engineering [T-MACH-105164]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

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

<table>
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<tr>
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<th>SS 2020</th>
<th>2182642</th>
<th>Laser in automotive engineering</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
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</thead>
</table>

**Competence Certificate**
oral examination (30 min)

**no tools or reference materials**

**Prerequisites**
It is not possible, to combine this brick with brick Physical Basics of Laser Technology [T-MACH-109084] and brick Physical Basics of Laser Technology [T-MACH-102102]

**Recommendation**
preliminary knowledge in mathematics, physics and materials science

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

Laser in automotive engineering
2182642, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)
Content
Based on a short description of the physical basics of laser technology the lecture reviews the most important high power lasers and their various applications in automotive engineering. Furthermore the application of laser light in metrology and safety aspects will be addressed.

- physical basics of laser technology
- laser beam sources (Nd:YAG-, CO2-, high power diode-laser)
- beam properties, guiding and shaping
- basics of materials processing with lasers
- laser applications in automotive engineering
- economical aspects
- safety aspects

The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of Nd:YAG-, CO2- and high power diode-laser sources.
- can describe the most important methods of laser-based processing in automotive engineering and illustrate the influence of laser, material and process parameters
- can analyse manufacturing problems and is able to choose a suitable laser source and process parameters.
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

It is not possible, to combine this lecture with the lecture Physical basics of laser technology [2181612].

regular attendance: 22.5 hours
self-study: 97.5 hours
oral examination (ca. 30 min)

no tools or reference materials

Organizational issues
Bitte nutzen Sie die Vorlesungsaufzeichnung aus dem SS 19!
Bei Interesse bitte melden bei johannes.schneider@kit.edu!
Aktuelle Infos werden über ILIAS verteilt!

Literature
R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer
7.223 Course: Laser Physics [T-ETIT-100741]

Responsible: Prof. Dr.-Ing. Christian Koos
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-101292 - Microoptics
M-MACH-101295 - Optoelectronics and Optical Communication

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Prerequisites
none
7.224 Course: Law of Contracts [T-INFO-101316]

**Responsible:** Dr. Alexander Hoff  
**Organisation:** KIT Department of Informatics  
**Part of:**  
M-INFO-101216 - Private Business Law  
M-INFO-101242 - Governance, Risk & Compliance

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<td>Law of Contracts</td>
<td>2</td>
<td>Lecture (V)</td>
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**7.225 Course: Laws concerning Traffic and Roads [T-BGU-106615]**

**Responsible:** Hon.-Prof. Dr. Dietmar Hönig

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

**Part of:** M-BGU-101066 - Safety, Computing and Law in Highway Engineering

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**Events**

| Events | SS 2020 6233803 | Verkehrs-, Planungs- und Wegerecht | 2 SWS | Lecture (V) | Hönig |

**Competence Certificate**
written exam, 60 min.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7.226 Course: Lean Construction [T-BGU-108000]

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

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

**Part of:** M-BGU-101884 - Lean Management in Construction

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**Events**

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<td>Lean Construction</td>
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<td>Haghsheno, Mitarbeiter/innen</td>
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**Competence Certificate**

written exam, 70 min.

**Prerequisites**

none

**Recommendation**

none

**Annotation**

none
7 COURSES

7.227 Course: Learning Factory “Global Production” [T-MACH-105783]

<table>
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<tr>
<th>Responsible:</th>
<th>Prof. Dr.-Ing. Gisela Lanza</th>
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<td>Organisation:</td>
<td>KIT Department of Mechanical Engineering</td>
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<td>M-MACH-105455 - Strategic Design of Modern Production Systems</td>
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<td>Learning Factory “Global Production”</td>
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**Competence Certificate**

Alternative test achievement (graded):

- Knowledge acquisition in the context of the seminar (4 achievements 20 min each) with weighting 40%.
- Interaction between participants with weighting 15%.
- Scientific colloquium (in groups of 3 students approx. 45 min each) with weighting 45%.

**Prerequisites**

none

**Annotation**

For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/lernfabrik.php).

Due to the limited number of participants, advance registration is required.

Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

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

**Learning Factory “Global Production”**

2149612, WS 20/21, 4 SWS, Language: German, [Open in study portal](http://www.wbk.kit.edu/lernfabrik.php)
Content
The learning factory “Global Production” serves as a modern teaching environment for the challenges of global production. These are made tangible using the example of the manufacture of electric motors under real production conditions. The course is characterized by its interactive hands-on sessions, which are theoretically supported by e-learning units. The e-learning units serve to convey essential basics as well as to deepen specific topics from the classroom units (e.g. site selection, supplier selection and planning of production networks). The focus of the hands-on sessions is the case-specific application of relevant methods for planning and managing global production networks.

First, classical methods and tools of Lean Management for the site-specific design of the production system (e.g. Kanban and JIT/JIS, Line Balancing) are learned and extended by methods of Industry 4.0. Within the scope of site-specific quality assurance, essential methods for data-driven quality assurance in complex production systems are taught and made practically tangible by means of a Six Sigma project. The focus is especially on methods of data mining with an excursion on artificial intelligence. 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. Finally, the view of the entire value chain network will be broadened by the integration of partners from the value chain. Thereby selected methods of supplier management (e.g. make-or-buy) and network design are learned and implemented. In the field of network management, collaboration between value chain partners and locations is considered a tool for increasing efficiency and avoiding disruptions. The special importance of digitisation as an enabler of collaboration is illustrated by the implementation of a traceability concept. 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
- Lean Management and Industry 4.0
- Six Sigma 4.0 - Data Mining for Site-Specific Quality Assurance
- Scalable Automation and Human-Robot Collaboration
- Supplier Management
- Network Planning and Design
- Collaboration and Traceability

Learning Outcomes:
The students are able to ...

- evaluate and select alternative locations using appropriate methods.
- use methods and tools of lean management to plan and manage production systems that are suitable for the location.
- use the Six Sigma method and apply goal-oriented process management.
- Derive automation potentials and systematically decide on a suitable degree of automation of production plants under given constraints.
- make use of well-established methods for the evaluation and selection of suppliers.
- apply methods for planning a global production network depending on company-specific circumstances to sketch a suitable network and classify and evaluating it according to specific criteria.
- understand general interactions in the production network and effectively develop collaboration in the production Environment.
- apply the learned methods and approaches with regard to problem solving in a global production environment and able to reflect their effectiveness.

Workload:
e-Learning: ~ 36 h
regular attendance: ~ 64 h
self-study: ~ 80 h
Organizational issues
Termine werden über die Institutshomepage bekanntgegeben.
Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Teilnehmer begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/lernfabrik.php)
Aufgrund der begrenzten Teilnehmerzahl ist eine Voranmeldung erforderlich.
Die Studierenden sollten Vorkenntnisse in mindestens einem der folgenden Bereiche haben:

- Integrierte Produktionsplanung
- Globale Produktion und Logistik
- Qualitätsmanagement

Dates will be announced on the homepage of the institute.
For organisational reasons, the number of participants for the course is limited to 20. As a result, a selection process will take place. Applications must be submitted via the wbk homepage (http://www.wbk.kit.edu/lernfabrik.php).
Due to the limited number of participants, advance registration is required.
Students should have previous knowledge in at least one of the following areas:

- Integrated Production Planning
- Global Production and Logistics
- Quality Management

Literature
Medien:

Media:
E-learning platform ilias, powerpoint, photo protocol. The media are provided through ilias (https://ilias.studium.kit.edu/).
7.228 Course: Liberalised Power Markets [T-WIWI-107043]

- **Responsible:** Prof. Dr. Wolf Fichtner
- **Organisation:** KIT Department of Economics and Management
- **Part of:**
  - M-WIWI-102808 - Digital Service Systems in Industry
- **Type:** Written examination
- **Credits:** 3
- **Recurrence:** Each winter term
- **Version:** 1

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<td>WS 20/21 2581998 Liberalised Power Markets 2 SWS Lecture (V) Fichtner</td>
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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

*Below you will find excerpts from events related to this course:*
Content
1. Power markets in the past, now and in future
2. Designing liberalised power markets
   2.1. Unbundling Dimensions of liberalised power markets
   2.2. Central dispatch versus markets without central dispatch
   2.3. The short-term market model
   2.4. The long-term market model
   2.5. Market flaws and market failure
   2.6. Regulation in liberalised markets
3. The power (sub)markets
   3.1 Day-ahead market
   3.2 Intraday market
   3.3 (Long-term) Forwards and futures markets
   3.4 Emission rights market
   3.5 Market for ancillary services
   3.6 The "market" for renewable energies
   3.7 Future market segments
4. Grid operation and congestion management
   4.1. Grid operation
   4.2. Congestion management
5. Market power
   5.1. Defining market power
   5.2. Indicators of market power
   5.3. Reducing market power
6. Future market structures in the electricity value chain
   1. Power markets in the past, now and in future
   2. Designing liberalised power markets
   2.2. Unbundling Dimensions of liberalised power markets
   2.3. Central dispatch versus markets without central dispatch
   2.4. The short-term market model
   2.5. The long-term market model
   2.6. Market flaws and market failure
   2.7. Regulation in liberalised markets
3. The power (sub)markets
   3.1 Day-ahead market
   3.2 Intraday market
   3.3 (Long-term) Forwards and futures markets
   3.4 Emission rights market
   3.5 Market for ancillary services
   3.6 The "market" for renewable energies
   3.7 Future market segments
4. Grid operation and congestion management
   4.1. Grid operation
   4.2. Congestion management
5. Market power
   5.1. Defining market power
   5.2. Indicators of market power
   5.3. Reducing market power
6. Future market structures in the electricity value chain
Literature

Weiterführende Literatur:

**Course: Life Cycle Assessment [T-WIWI-110512]**

**Responsible:** Prof. Dr. Frank Schultmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101412 - Industrial Production III  
M-WIWI-101471 - Industrial Production II

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<td>Life Cycle Assessment</td>
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<td>Lecture (V)</td>
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**Competence Certificate**  
The examination takes place in the form of a written examination (according to §4(2), 1 SPO). The examination is offered every semester and can be repeated at any regular examination date.

**Prerequisites**  
None.

**Recommendation**  
None.

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

**Life Cycle Assessment**  
2581995, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)  
**Lecture (V)**

**Content**  
Introduction to life cycle assessment. The lecture describes structure and individual steps of life cycle assessment in detail.

**Literature**  
werden in der Veranstaltung bekannt gegeben
7.230 Course: Logistics and Supply Chain Management [T-MACH-110771]

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

Part of: M-MACH-105298 - Logistics and Supply Chain Management

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

Prerequisites
None

Annotation
The brick cannot be taken if one of the bricks "T-MACH-102089 – Logistics - Organisation, Design and Control of Logistic Systems" and "T-MACH-105181 – Supply Chain Management" has been taken.

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

V Logistics and Supply Chain Management
2118078, SS 2020, 4 SWS, Language: English, Open in study portal
Lecture (V)

Content
In the lecture "Logistics and Supply Chain Management", comprehensive and well-founded fundamentals of crucial issues in logistics and supply chain management are presented. Furthermore, the interaction of different design elements of supply chains is emphasized. For this purpose, both qualitative and quantitative models are presented and applied. Additionally, methods for mapping and evaluating logistics systems and supply chains are described. The contents of the lecture are deepened in exercises and case studies and comprehension is partially reviewed in case studies. The contents will be illustrated, among other things, on the basis of supply chains in the automotive industry.

Among others, the following topics are covered:

- Inventory Management
- Forecasting
- Bullwhip Effect
- Supply Chain Segmentation and Collaboration
- Key Performance Indicators
- Supply Chain Risk Management
- Production Logistics
- Location Planning
- Route Planning
<table>
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<tr>
<th>Responsible</th>
<th>Bastian Chlond</th>
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<tr>
<td>Organisation</td>
<td>KIT Department of Civil Engineering, Geo- and Environmental Sciences</td>
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<td>M-BGU-101064 - Fundamentals of Transportation</td>
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<tr>
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<td>6232904</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Chlond, Dozenten</td>
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Competence Certificate
written exam, 60 min.

Prerequisites
none

Recommendation
none

Annotation
none
Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

Type
Written examination

Credits
4.5

Recurrence
Each winter term

Version
2

Events

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<td>WS 20/21</td>
<td>2511500</td>
<td>Machine Learning 1 - Fundamental Methods</td>
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<td>WS 20/21</td>
<td>2511501</td>
<td>Exercises to Machine Learning 1 - Fundamental Methods</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 or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

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

Prerequisites
None.

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

Machine Learning 1 - Fundamental Methods
2511500, WS 20/21, 2 SWS, Language: German, [Open in study portal]

Content
The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

Learning objectives:
- Students acquire knowledge of the fundamental methods in the field of machine learning.
- Students can classify, formally describe and evaluate methods of machine learning.
- Students can use their knowledge to select suitable models and methods for selected problems in the field of of machine learning.

Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur
- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.
### 7.233 Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

**Responsible:** Prof. Dr.-Ing. Johann Marius Zöllner  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
M-WIWI-101472 - Informatics  
M-WIWI-101628 - Emphasis in Informatics  
M-WIWI-101630 - Electives in Informatics  
M-WIWI-101637 - Analytics and Statistics  

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#### Events

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<td>SS 2020 2511503</td>
<td>1 SWS</td>
<td>Exercises for Machine Learning 2 - Advanced Methods</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 or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

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

**Prerequisites**

None.

---

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

### Machine Learning 2 - Advanced methods

V 2511502, SS 2020, 2 SWS, Language: German, [Open in study portal]

**Lecture (V)**

**Content**

The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

**Learning objectives:**

- Students understand extended concepts of machine learning and their possible applications.
- Students can classify, formally describe and evaluate methods of machine learning.
- In detail, methods of machine learning can be embedded and applied in complex decision and inference systems.
- Students can use their knowledge to select suitable models and methods of machine learning for existing problems in the field of machine intelligence.

**Recommendations:**

Attending the lecture Machine Learning 1 or a comparable lecture is very helpful in understanding this lecture.
Literature
Die Foliensätze sind als PDF verfügbar

Weiterführende Literatur

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Weitere (spezifische) Literatur zu einzelnen Themen wird in der Vorlesung angegeben.
7.234 Course: Machine Tools and High-Precision Manufacturing Systems [T-MACH-110963]

**Responsible:** Prof. Dr.-Ing. Jürgen Fleischer  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101286 - Machine Tools and Industrial Handling

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<tr>
<td>WS 20/21</td>
<td>2149910</td>
<td>Machine Tools and High-Precision Manufacturing Systems</td>
<td>6</td>
<td>Lecture / Practice (VÜ)</td>
<td>Fleischer</td>
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</table>

**Competence Certificate**

Written exam (120 minutes)

**Prerequisites**

T-MACH-102158 - Machine Tools and Industrial Handling must not be commenced.  
T-MACH-109055 - Machine Tools and Industrial Handling must not be commenced.  
T-MACH-110962 - Machine Tools and High-Precision Manufacturing Systems must not be commenced.

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

**Machine Tools and High-Precision Manufacturing Systems**  
2149910, WS 20/21, 6 SWS, Language: German, [Open in study portal](#)
Content
The lecture gives an overview of the construction, use and application of machine tools and high-precision manufacturing systems. In the course of the lecture a well-founded and practice-oriented knowledge for the selection, design and evaluation of machine tools and high-precision manufacturing systems is conveyed. First, the main components of the systems are systematically explained and their design principles as well as the integral system design are discussed. Subsequently, the use and application of machine tools and high-precision manufacturing systems will be demonstrated using typical machine examples. Based on examples from current research and industrial applications, the latest developments are discussed, especially concerning the implementation of Industry 4.0.

The individual topics are:

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

Learning Outcomes:
The students ...

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

Workload:
MACH:
regular attendance: 63 hours
self-study: 177 hours

WING/TVWL:
regular attendance: 63 hours
self-study: 207 hours

Organizational issues
Vorlesungstermine montags und mittwochs, Übungstermine donnerstags.
Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.
Lectures on Mondays and Wednesdays, tutorial on Thursdays.
The tutorial dates will announced in the first lecture.

Literature
Medien:
Skript zur Veranstaltung wird über Ilias [https://ilias.studium.kit.edu/] bereitgestellt.

Media:
Lecture notes will be provided in Ilias [https://ilias.studium.kit.edu/].
### 7.235 Course: Management Accounting 1 [T-WIWI-102800]

**Responsible:** Prof. Dr. Marcus Wouters  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101498 - Management Accounting

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**Events**

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<td>Lecture (V)</td>
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<td>SS 2020</td>
<td>Übung zu Management Accounting 1 (Bachelor)</td>
<td>Practice (Ü)</td>
<td>2 SWS</td>
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<td>Management Accounting 1</td>
<td>Practice (Ü)</td>
<td>2 SWS</td>
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**Competence Certificate**

The assessment consists of a written exam (120 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester.

**Prerequisites**

None

**Annotation**

Students in the Bachelor’s program can only take the related tutorial and examination. Students in the Master’s program (and Bachelor’s students who are already completing examinations for their Master’s program) can only take the related tutorial and examination.

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

**Management Accounting 1**  
2579900, SS 2020, 2 SWS, Language: English, [Open in study portal](#)  
**Lecture (V)**

**Content**

The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

**Learning objectives:**

- Students have an understanding of theory and applications of management accounting topics.
- They can use financial information for various purposes in organizations.

**Examination:**

- The assessment consists of a written exam (120 minutes) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

**Workload:**

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

- In addition, several papers that will be available on ILIAS.

**Übung zu Management Accounting 1 (Bachelor)**
2579901, SS 2020, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook

**Übung zu Management Accounting 1 (Bachelor)**
2579902, SS 2020, 2 SWS, Language: English, Open in study portal

Content
see Module Handbook
7.236 Course: Management Accounting 2 [T-WIWI-102801]

Responsible: Prof. Dr. Marcus Wouters
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101498 - Management Accounting

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<td>Practice (Ü)</td>
<td>2 SWS</td>
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</table>

Competence Certificate
The assessment consists of a written exam (120 minutes) at the end of each semester.

Prerequisites
None

Recommendation
It is recommended to take part in the course “Management Accounting 1” before this course.

Annotation
Students in the Bachelor’ program can only take the related tutorial and examination. Students in the Master’s program (and Bachelor’s students who are already completing examinations for their Master’s program) can only take the related tutorial and examination.

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

Management Accounting 2
2579903, WS 20/21, 2 SWS, Language: English, Open in study portal
Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

Learning objectives:
- Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Recommendations:
- It is recommended to take part in the course "Management Accounting 1" before this course.

Examination:
- The assessment consists of a written exam (120 min) at the end of each semester (following § 4 (2) No. 1 of the examination regulation).

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

Literature
- Zusätzlich werden Artikel auf ILIAS zur Vergütung gestellt.

V 2579904, WS 20/21, 2 SWS, Language: English, Open in study portal Practice (Ü)

Content see ILIAS

V 2579905, WS 20/21, 2 SWS, Language: English, Open in study portal Practice (Ü)

Content see ILIAS
T 7.237 Course: Management of IT-Projects [T-WIWI-102667]

- **Responsible:** Dr. Roland Schätzle
- **Organisation:** KIT Department of Economics and Management
- **Part of:**
  - M-WIWI-101472 - Informatics
  - M-WIWI-101628 - Emphasis in Informatics
  - M-WIWI-101630 - Electives in Informatics

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<td>SS 2020</td>
<td>2511215</td>
<td>Übungen zu Management von Informatik-Projekten</td>
<td>1</td>
<td>Practice (Ü)</td>
<td>Schätzle</td>
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</table>

**Competence Certificate**

The assessment takes place in the form of a written examination (exam) in the amount of 60 minutes. The examination is offered every semester and can be repeated at any regular examination date.

Prerequisite for the participation in the examination is the successful participation in the exercise, which takes place in the summer semester, starting from summer semester 2020. The number of participants in the exercise is limited.

The exact details will be announced in the lecture.

**Prerequisites**

Prerequisite for the participation in the examination is the successful participation in the exercise, which takes place in the summer semester, starting from summer semester 2020. The number of participants in the exercise is limited.

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

Learning objectives:
Students

- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropriate to current project phases and project contexts,
- consider organisational and social impact factors.

Recommendations:
Knowledge from the lecture Software Engineering is helpful.

Workload:

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

Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004

Übungen zu Management von Informatik-Projekten
2511215, SS 2020, 1 SWS, Language: German, Open in study portal

Content
The general conditions, influencing factors and methods in the planning, execution and control of IT projects are dealt with. In particular, the following topics will be dealt with: Project environment, project organization, project structure plan, effort estimation, project infrastructure, project control, decision-making processes, negotiation, time management. The lecture is accompanied by exercises in the form of tutorials. The date of the exercise will be announced later.
7.238 Course: Management of Water Resources and River Basins [T-BGU-106597]

**Responsible:** Dr.-Ing. Uwe Ehret

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

**Part of:** M-WIWI-104837 - Natural Hazards and Risk Management

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<td>4 SWS</td>
<td>Lecture / Practice (VÜ)</td>
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**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
7.239 Course: Managing New Technologies [T-WIWI-102612]

**Responsible:** Dr. Thomas Reiß  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101488 - Entrepreneurship (EnTechnon)

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**Events**

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<td>SS 2020</td>
<td>2545003</td>
<td>Managing New Technologies</td>
<td>2 SWS</td>
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**Competence Certificate**
Written exam 100% following §4, Abs. 2.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The credit points for T-WIWI-102612 "Management of New Technologies" were reduced to 3 credit points in the 2019 summer semester.

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

**Managing New Technologies**
2545003, SS 2020, 2 SWS, Language: German, Open in study portal

**Literature**
- Hausschildt/Salomo: Innovationsmanagement  
- Borchert et al.: Innovations- und Technologiemanagement  
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

Die relevanten Auszüge und zusätzlichen Quellen werden in der Veranstaltung bekannt gegeben.
7.240 Course: Manufacturing Technology [T-MACH-102105]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101276 - Manufacturing Technology

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<td>6 SWS</td>
<td>Schulze, Gerstenmeyer</td>
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**Competence Certificate**

Written Exam (180 min)

**Prerequisites**

none

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

**Manufacturing Technology**

2149657, WS 20/21, 6 SWS, Language: German, Open in study portal  
Lecture / Practice (VÜ)
Content
The objective of the lecture is to look at manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to impart detailed process knowledge of the common processes. The lecture covers the basic principles of manufacturing technology and deals with the manufacturing processes according to their classification into main groups regarding technical and economic aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Quality control
- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming, plastics engineering)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing

This lecture provides an excursion to an industry company.

Learning Outcomes:
The students...

- are capable to specify the different manufacturing processes and to explain their functions.
- are able to classify the manufacturing processes by their general structure and functionality according to the specific main groups.
- have the ability to perform a process selection based on their specific characteristics.
- are enabled to identify correlations between different processes and to select a process regarding possible applications.
- are qualified to evaluate different processes regarding specific applications based on technical and economic aspects.
- are experienced to classify manufacturing processes in a process chain and to evaluate their specific influence on surface integrity of workpieces regarding the entire process chain.

Workload:
regular attendance: 63 hours
self-study: 177 hours

Organizational issues
Vorlesungstermine montags und dienstags, Übungstermine mittwochs. Bekanntgabe der konkreten Übungstermine erfolgt in der ersten Vorlesung.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

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

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

**Part of:**
- M-WIWI-101409 - Electronic Markets
- M-WIWI-101411 - Information Engineering
- M-WIWI-101446 - Market Engineering
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-102754 - Service Economics and Management

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**Events**

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<th>2540460</th>
<th>Market Engineering: Information in Institutions</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
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<td>SS 2020</td>
<td>2540461</td>
<td>Übungen zu Market Engineering: Information in Institutions</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). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) up to 6 bonus points can be obtained. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by max. one grade level (0.3 or 0.4).

**Prerequisites**
None

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

**Market Engineering: Information in Institutions**
2540460, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Literature**

7.242 Course: Market Research [T-WIWI-107720]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-101647 - Data Science: Evidence-based Marketing
M-WIWI-105312 - Marketing and Sales Management

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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 related to this course:

Market Research
2571150, SS 2020, 2 SWS, Language: English, Open in study portal
Content
Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:
- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

The aim of this lecture is to give an overview of essential statistical methods. In the lecture students learn the practical use as well as the correct handling of different statistical survey methods and analysis procedures. In addition, emphasis is put on the interpretation of the results after the application of an empirical survey. The derivation of strategic options is an important competence that is required in many companies in order to react optimally to customer needs.

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

The total workload for this course is approximately 135.0 hours.

Presence time: 30 hours
Preparation and wrap-up of the course: 45.0 hours
Exam and exam preparation: 60.0 hours

Please note that this course has to be completed successfully by students interested in master thesis positions at the chair of marketing.

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

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<td>1 SWS</td>
<td>Practice (Ü)</td>
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</table>

**Alternative exam Certificate**  
Alternative exam assessment (Working on tasks in groups during the lecture).

**Prerequisites**  
The prerequisite for taking the course is the successful completion of the course "Market Research".

**Recommendation**  
It is strongly recommended to complete the course "Market Research" prior to taking the "Marketing Analytics" course.

**Annotation**  
"Marketing Analytics" will be offered as a block course in the winter term 20/21 with an alternative exam assessment. For further information please contact the Marketing and Sales Research Group (marketing.iism.kit.edu). Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

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

#### Marketing Analytics

**2572170, WS 20/21, 2 SWS, Language: English,** [Open in study portal](#)  
**Lecture (V)**

**Content**  
In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling, structural equation modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

Students

- receive based on the course market research an overview of advanced empirical methods
- learn in the course of the lecture to handle advanced data collection and data analysis methods
- are based on the acquired knowledge able to interpret results and derive strategic implications

Total workload for 4.5 ECTS: ca. 135 hours.

In order to attend Marketing Analytics, students are required to have passed the course Market Research.

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

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

**Organizational issues**  
Blockveranstaltung
Literature

- Cameron, A. Colin, Trivedi, Pravin K. (2005), Microeconometrics: methods and applications, New York.
- Chapman, Christopher, Feit, Elea M. (2015), R for Marketing Research and Analytics, Cham.
### Course: Marketing Strategy Business Game [T-WIWI-102835]

**Responsible:** Prof. Dr. Martin Klarmann  
**Organisation:** KIT Department of Economics and Management

**Part of:**  
- M-WIWI-101510 - Cross-Functional Management Accounting  
- M-WIWI-105312 - Marketing and Sales Management

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**Events**

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<td>Marketing Strategy Business Game</td>
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<td>Klarmann, Mitarbeiter</td>
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<td>SS 2020</td>
<td>2571184</td>
<td>Real World Lab: Innovation Communication</td>
<td>1 SWS</td>
<td>Block (B)</td>
<td>Klarmann, Feurer, Honold</td>
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</tbody>
</table>

**Competence Certificate**

The assessment (alternative exam assessment) consists of a group presentation and a subsequent round of questions totalling 20 minutes.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

Please note that only one of the courses from the election block can be chosen in the module.

Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS points in the respective module to all students. Participation in a specific course cannot be guaranteed.

In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

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

---

**Marketing Strategy Business Game**

2571183, SS 2020, 1 SWS, Language: German, [Open in study portal](#)
Content
Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups' companies.

Students
- are able to operate the strategic marketing simulation software "Markstrat"
- are able to take strategic marketing decisions in groups
- know how to apply strategic marketing concepts to practical contexts (e.g. for market segmentation, product launches, coordination of the marketing mix, market research, choice of the distribution channel or competitive behavior)
- are capable to collect and to select information usefully with the aim of decision-making
- are able to react appropriately to predetermined market conditions
- know how to present their strategies in a clear and consistent way
- are able to talk about the success, problems, critical incidents, external influences and strategy changes during the experimental game and to reflect and present their learning success

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

The total workload for this course is approximately 45.0 hours. For further information see German version.

- Please note that only one of the courses from the election block can be chosen in the module.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

Organizational issues
Termine werden bekannt gegeben

Literature
Content
In this interactive course, students work in groups to develop and test a suitable communication measure to accompany the market launch of an innovative product by a start-up from Karlsruhe. For this purpose, the course is divided into four phases. (1) First, students work in groups to develop different scientific fundamentals (e.g. company goals, product/market characteristics, target groups, communication of innovations) and share these findings with other groups in the form of a team presentation. (2) Then each group independently develops its own online communication measure, which can be realized with a given budget and makes use of the knowledge gained from (1). (3) The groups implement this measure in the field, evaluate its effectiveness according to given criteria (KPIs) and adapt it if necessary. (4) Finally, the design and success of the measure are critically reflected and discussed and shared with the other groups in the form of a final presentation.
Information about the start-up: It is a medical device for the treatment of insect bites (+ corresponding app) with the smartphone. Launch of the product is spring 2020. Further information at heatit.de

Learning objectives
Students
- have the ability to make strategic marketing decisions independently in groups
- can apply basic marketing strategy concepts (e.g. market segmentation, product launch, coordination of the marketing mix, market research, channel selection or competitive behaviour) to a practical context
- can collect, analyze and meaningfully prepare information and KPIs for decision-making
- can react to given market conditions in a coordinated manner
- are able to present their strategy in a clear and coherent manner
- are able to talk about success, problems, important events, external influences and strategy changes during the practical test and present their learning effects in a reflected manner

Total effort
with 1.5 credit points: approx. 45 hours

Presence time
9 hours (3 compulsory dates: kick-off, 1st presentation, final presentation)
Preparation and follow-up of the course: 28.5 hours
Exam and exam preparation: 7.5 hours

Examination
The control of success is carried out in the form of an examination performance of another kind according to § 4 paragraph 2 no. 3 SPO (two team presentations)

Notes
An application is required for participation in this course. The application phase usually takes place at the beginning of the lecture period in the summer semester. This course is restricted. The research group Marketing and Sales typically allows all students to attend a course at 1.5 credit points in the corresponding module. A guarantee for the attendance of a specific course can not be given, though. Further information can be obtained directly from the research group Marketing and Sales [marketing.iism.kit.edu]. Please note that only one of the 1.5-ECTS events can be credited for the module.

Organizational issues
Einmalige Veranstaltung im Sommer 2020
Termine werden bekannt gegeben
7.245 Course: Master Thesis [T-WIWI-103142]

**Responsible:** Studiendekan der KIT-Fakultät für Informatik
Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften

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

**Part of:** M-WIWI-101650 - Module Master Thesis

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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
7.246 Course: Material Flow in Logistic Systems [T-MACH-102151]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101277 - Material Flow in Logistic Systems

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**Events**

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<th>SWS</th>
<th>Others (sonst.)</th>
<th>Furmans, Jacobi, Klein</th>
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<tr>
<td>WS 20/21</td>
<td>2117051</td>
<td>Material flow in logistic systems</td>
<td>6 SWS</td>
<td>Others (sonst.)</td>
<td>Furmans, Jacobi, Klein</td>
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**Competence Certificate**

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

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

A detailed description of the learning control can be found under Annotations.

**Prerequisites**

none

**Recommendation**

Recommended elective subject: Probability Theory and Statistics

**Annotation**

Students are divided into groups for this course. Five case studies are carried out in these groups. The results of the group work during the lecture period are presented and evaluated in writing. In the oral examination during the case study colloquiums, the understanding of the result of the group work and the models dealt with in the course is tested. The participation in the oral defenses is compulsory and will be controlled. For the written submission the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

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

<table>
<thead>
<tr>
<th>Material flow in logistic systems</th>
<th>Code</th>
<th>Material flow in logistic systems</th>
<th>SWS</th>
<th>Language: German</th>
<th>Open in study portal</th>
<th>Others (sonst.)</th>
</tr>
</thead>
</table>
Content

Learning Content:

- Elements of material flow systems (conveyor elements, fork, join elements)
- Models of material flow networks using graph theory and matrices
- Queueing theory, calculation of waiting time, utilization
- Warehousing and order-picking
- Shuttle systems
- Sorting systems
- Simulation
- Calculation of availability and reliability
- Value stream analysis

After successful completion of the course, you are able (alone and in a team) to:

- Accurately describe a material handling system in a conversation with an expert.
- Model and parameterize the system load and the typical design elements of a material handling system.
- Design a material handling system for a task.
- Assess the performance of a material handling system in terms of the requirements.
- Change the main lever for influencing the performance.
- Expand the boundaries of today's methods and system components conceptually if necessary.

Literature:
Arnold, Dieter; Furmans, Kai: Materialfluss in Logistiksystemen; Springer-Verlag Berlin-Heidelberg, 2009

Description:
Students are divided into groups for this course. Five case studies are carried out in these groups. The results of the group work during the lecture period are presented and evaluated in writing. During the colloquia, the result of the case study is presented and the understanding of the group work and the models dealt with in the course are tested in an oral defense. The participation in the colloquia is compulsory and will be controlled. For the written submission and the presentation the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

We strongly recommend to attend the introductory session at 02.11.2020. In this session, the teaching concept of "Materialfluss in Logistiksystemen" is explained and outstanding issues are clarified.

Registration for the course including group allocation via ILIAS is mandatory. The registration will be activated for several days after the introductory session (registration period: 02.11.2020 08:00 h - 08.11.2020 18:00 h).

Workload:

- Regular attendance: 35 h
- Self-study: 135 h
- Group work: 100 h

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

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
  - 40% assessment of the result and the presentation of the case studies as group work,
  - 20% assessment of the oral examination during the colloquia as individual performance.
7.247 Course: Mathematical Models and Methods for Production Systems [T-MACH-105189]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101278 - Material Flow in Networked Logistic Systems

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<td>2117059</td>
<td>Mathematical models and methods for Production Systems</td>
<td>4 SWS</td>
<td>Lecture (V)</td>
<td>Baumann, Furmans, Zimmermann</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 related to this course:

**Mathematical models and methods for Production Systems**

2117059, WS 20/21, 4 SWS, Language: English, Open in study portal

**Content**

**Media:**
black board, lecture notes, presentations

**Learning Content:**
- Single server systems: M/M/1, M/G/1: priority rules, model of failures
- Networks: open and closed approximations, exact solutions and approximations
- Application to flexible manufacturing systems, AGV (automated guided vehicles) - systems
- Modeling of control approaches like constant work in process (ConWIP) or kanban
- Discrete-time modeling of queuing systems

**Learning Goals:**
Students are able to:
- Describe queueing systems with analytical solvable stochastic models,
- Derive approaches for modeling and controlling material flow and production systems based on models of queueing theory,
- Use simulation and exakt methods.

**Recommendations:**
- Basic knowledge of statistic
- Recommended lecture: Materials flow in logistic systems (also parallel)

**Registration information:**
This lecture has a restricted number of participants. Further information for registration and deadlines can be found on the website of the institute.

**Workload:**
regular attendance: 42 hours  
self-study: 198 hours
Literature
Shanthikumar, Buzacott: Stochastic Models of Manufacturing Systems
7.248 Course: Metal Forming [T-MACH-105177]

**Responsible:** Dr. Thomas Herlan

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101284 - Specialization in Production Engineering

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<tr>
<td>Metal Forming</td>
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**Competence Certificate**

Oral Exam (20 min)

**Prerequisites**

none

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

**Metal Forming**

2150681, SS 2020, 2 SWS, Language: German, [Open in study portal](#)
Content
At the beginning of the lecture the basics of metal forming are briefly introduced. The focus of the lecture is on massive forming ( forging, extrusion, rolling) and sheet forming (car body forming, deep drawing, stretch drawing). This includes the systematic treatment of the appropriate metal forming Machines and the corresponding tool technology. Aspects of tribology, as well as basics in material science and aspects of production planning are also discussed briefly. The plastic theory is presented to the extent necessary in order to present the numerical simulation method and the FEM computation of forming processes or tool design. The lecture will be completed by product samples from the forming technology.

The topics are as follows:

- Introduction and basics
- Hot forming
- Metal forming machines
- Tools
- Metallographic fundamentals
- Plastic theory
- Tribology
- Sheet forming
- Extrusion
- Numerical simulation

Learning Outcomes:
The students ...

- are able to reflect the basics, forming processes, tools, Machines and equipment of metal forming in an integrated and systematic way.
- are capable to illustrate the differences between the forming processes, tools, machines and equipment with concrete examples and are qualified to analyze and assess them in terms of their suitability for the particular application.
- are also able to transfer and apply the acquired knowledge to other metal forming problems.

Workload:
regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Start: 24.04.2020
Vorlesungstermine freitags, wöchentlich.
Die konkreten Termine werden in der ersten Vorlesung bekannt gegeben und auf der Instituts homepage und ILIAS veröffentlicht.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)
7.249 Course: Methods and Models in Transportation Planning [T-BGU-101797]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

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

**Part of:** M-BGU-101065 - Transportation Modelling and Traffic Management

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**Events**

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<tr>
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<th>Code</th>
<th>Name</th>
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<th>Instructor</th>
</tr>
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<tbody>
<tr>
<td>WS 20/21</td>
<td>6232701</td>
<td>Berechnungsverfahren und Modelle in der Verkehrsplanung</td>
<td>2</td>
<td>Lecture / Practice (VÜ)</td>
<td>Vortisch, Mitarbeiter/innen</td>
</tr>
</tbody>
</table>

**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 - Innovation Economics

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**Events**  
SS 2020  | 2560240 | Methods in Economic Dynamics | SWS | Lecture (V) | Ott, Bälz |

**Competence Certificate**  
Alternative exam assessment.

**Prerequisites**  
None

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

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

**Methods in Economic Dynamics**  
2560240, SS 2020, SWS, Language: German/English, [Open in study portal](#)  

**Content**  
The economic exploitation of inventions is an important part of innovation economics. Intellectual property rights such as patents or trademarks play a central role. Within this workshop, the recording, processing and analysis of such intellectual property rights will be deepened, e.g. considering specific technologies. Students will learn how to work with relational databases, the econometric evaluation of recorded data, and methods for visualising them.

**Learning objectives:**  
The student  
- learns to query data sources.  
- is able to analyse data with statistical methods.  
- visualises and interprets data evaluations (e.g. using dashboards or methods of network analysis).

**Recommendations:**  
An interest in working with data, basic knowledge on databases as well as basic knowledge in economics and statistics are advantageous.

**Workload:**  
The total workload for this course is approximately 45 hours.  
- Classes: ca. 5 h  
- Self-study: ca. 40 h

**Assessment:**  
Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

**Literature**  
Relevante Literatur wird in der Vorlesung bekanntgegeben.  
(Relevant literature will be announced in the lecture.)
Course: Methods in Innovation Management [T-WIWI-110263]

Responsible: Dr. Daniel Jeffrey Koch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101507 - Innovation Management

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

Events
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<tr>
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<td>Seminar (S)</td>
<td>2 SWS</td>
<td>Koch</td>
<td>1</td>
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</table>

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO). The final grade is composed 75% of the grade of the written paper and 25% of the grade of the presentation.

Prerequisites
None.

Recommendation
Prior attendance of the course "Innovation Management: Concepts, Strategies and Methods" is recommended.

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

Methoden im Innovationsmanagement
2545107, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literature
Werden in der ersten Veranstaltung bekannt gegeben.
Course: Microactuators [T-MACH-101910]

**Responsible:** Prof. Dr. Manfred Kohl  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-ETIT-101158 - Sensor Technology I  
M-MACH-101287 - Microsystem Technology  
M-MACH-101290 - BioMEMS  
M-MACH-101292 - Microoptics

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<td>3</td>
<td>Each summer term</td>
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</table>

**Events**  
SS 2020 | 2142881 | Microactuators | 2 SWS | Lecture (V) | Kohl

**Competence Certificate**  
written exam, 60 min.

**Prerequisites**  
one none

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

**Microactuators**  
2142881, SS 2020, 2 SWS, Language: German, [Open in study portal]

**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

**Literature**  
- Folienskript "Mikroaktorik"  
- M. Kohl, Shape Memory Microactuators, M. Kohl, Springer-Verlag Berlin, 2004  


### 7.253 Course: Mixed Integer Programming I [T-WIWI-102719]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101473 - Mathematical Programming  
- M-WIWI-102832 - Operations Research in Supply Chain Management  
- M-WIWI-103289 - Stochastic Optimization

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<tr>
<td>Written examination</td>
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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

**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: Mixed Integer Programming II [T-WIWI-102720]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

<table>
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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

**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).
# 7.255 Course: Mobility Services and new Forms of Mobility [T-BGU-103425]

**Responsible:** Dr.-Ing. Martin Kagerbauer  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101064 - Fundamentals of Transportation  
- M-BGU-101065 - Transportation Modelling and Traffic Management  

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**Events**

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<td>6232811</td>
<td>Mobilitätservices und neue Formen der Mobilität</td>
<td>2 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Kagerbauer</td>
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</table>

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.256 Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

 Responsible: Dr. Verena Dorner
                   Prof. Dr. Christof Weinhardt
 Organisation: KIT Department of Economics and Management
 Part of: M-WIWI-101448 - Service Management
         M-WIWI-101506 - Service Analytics
         M-WIWI-103118 - Data Science: Data-Driven User Modeling

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<th>Version</th>
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</table>
| SS 2020 2540470 | 2 SWS   | Lecture (V)         | Dorner, Greif-Winzieth, Knierim
|                |         |                     |         |
| SS 2020 2540471 | 1 SWS   | Practice (Ü)        | Knierim, Greif-Winzieth, Dorner

 Competence Certificate
 The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

 Prerequisites
 None

 Recommendation
 None

 Annotation
 Number of participants limited.

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

 Modeling and Analyzing Consumer Behavior with R
 2540470, SS 2020, 2 SWS, Language: German, Open in study portal

 Literature
 Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)
**Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]**

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-102808 - Digital Service Systems in Industry  
- M-WIWI-102832 - Operations Research in Supply Chain Management

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<td>WS 20/21</td>
<td>2550490</td>
<td>Modellieren und OR-Software: Fortgeschrittene Themen</td>
<td>3</td>
<td>Practical course (P)</td>
<td>Pomes, Zander, Bakker</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 related to this course:*

**Modellieren und OR-Software: Fortgeschrittene Themen**  
2550490, WS 20/21, 3 SWS, Language: German, Open in study portal  
Practical course (P)

**Content**

The advanced course is designated for Master students that already attended the introductory course or gained equivalent experience elsewhere, e.g. during a seminar or bachelor thesis. We will work on advanced topics and methods in OR, among others cutting planes, column generation and constraint programming. The software used for the exercises is IBM ILOG CPLEX Optimization Studio. The associated modelling programming languages are OPL and ILOG Script.

**Organizational issues**

die genauen Termine werden auf der Homepage bekannt gegeben
### 7.258 Course: Morphodynamics [T-BGU-101859]

**Responsible:** Prof. Dr. Franz Nestmann  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-WIWI-104837 - Natural Hazards and Risk Management

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<td>Morphodynamics</td>
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</table>

**Competence Certificate**  
See German version.

**Prerequisites**  
None
**Course: Multivariate Statistical Methods [T-WIWI-103124]**

**Responsible:** Prof. Dr. Oliver Grothe  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101473 - Mathematical Programming  
- M-WIWI-101637 - Analytics and Statistics  
- M-WIWI-101639 - Econometrics and Statistics II  
- M-WIWI-103289 - Stochastic Optimization

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<td>Multivariate Verfahren</td>
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<td>Lecture (V)</td>
<td>Grothe</td>
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<td>SS 2020</td>
<td>2550555</td>
<td>Übung zu Multivariate Verfahren</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>Grothe, Kächele</td>
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</table>

**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).

The exam is offered every semester. Re-examinations are offered only for repeaters.

**Prerequisites**

None

**Recommendation**

The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course "Advanced Statistics". Without this, participation in the course is not advised.

Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

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

**Multivariate Verfahren**  
2550554, SS 2020, 2 SWS, Open in study portal

**Literature**

Skript zur Vorlesung
7.260 Course: Nanotechnology for Engineers and Natural Scientists [T-MACH-105180]

Responsible: Prof. Dr. Martin Dienwiebel
apl. Prof. Dr. Hendrik Hölscher
Stefan Walheim

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101294 - Nanotechnology

Type: Written examination
Credits: 4
Recurrence: Each summer term
Version: 1

Events

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<td>Lecture (V)</td>
<td>2 SWS</td>
<td>Hölscher, Dienwiebel</td>
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Competence Certificate
written exam 90 min

Prerequisites
none

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

Nanotechnology for Engineers and Natural Scientists
2142861, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
1) Introduction into nanotechnology
2) History of scanning probe techniques
3) Scanning tunneling microscopy (STM)
4) Atomic force microscopy (AFM)
5) Dynamic Modes (DFM, ncAFM, MFM, KPFM, ...)
6) Friction force microscopy & nanotribology
7) Nanolithography
8) Other families of the SPM family

The student can
- explain the most common measurement principles of nanotechnology especially scanning probe methods and is able to use them for the characterisation of chemical and physical properties of surfaces
- describe interatomic forces and their influence on nanotechnology
- describe methods of micro- and nanofabrication and of -nanolithography
- explain simple models used in contact mechanics and nanotribology
- describe basic concepts used for nanoscale components
- preliminary knowledge in mathematics and physics

The successful attendance of the lecture is controlled by a 30 minutes oral exam.
Organizational issues
Die Vorlesung findet im Sommersemester 2020 aufgrund der aktuellen Situation ausschließlich online statt. Zu jedem Vorlesungstermin werden folgende Materialien via ILIAS zum Selbststudium zur Verfügung gestellt:

1. Alle Folien zur jeweiligen Vorlesung im PDF-Format
2. Ausgewählte Folien/Themen als Video(s) mit Audiokommentar
3. Übungsaufgaben deren Lösungen jeweils eine Woche später online gestellt werden
4. Ausgewählte Originalartikel zu den Themen der jeweiligen Vorlesung

Zusätzlich gibt es jeweils zum geplanten Termin der Vorlesung ein Webinar (ca. 45 min.). Dies wird voraussichtlich mit der Software Zoom durchgeführt werden. Nähere Informationen werden sobald wie möglich via ILIAS zur Verfügung gestellt.

Literature
Alle Folien und Originalliteratur werden auf ILIAS zur Verfügung gestellt.
7.261 Course: Nanotechnology with Clusterbeams [T-MACH-102080]

**Responsible:** Dr. Jürgen Gspann

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101287 - Microsystem Technology
- M-MACH-101294 - Nanotechnology

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<tbody>
<tr>
<td>Written examination</td>
<td>3</td>
<td>Each winter term</td>
<td>1</td>
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</table>

**Competence Certificate**
- written examination
- presence in more than 70% of the lectures
- Duration: 1 h

**aids:** none

**Prerequisites**
- none
### 7.262 Course: Nanotribology and -Mechanics [T-MACH-102167]

**Responsible:** Prof. Dr. Martin Dienwiebel  
apl. Prof. Dr. Hendrik Hölscher  

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-MACH-101291 - Microfabrication  
M-MACH-101294 - Nanotechnology

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<td>Each summer term</td>
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**Events**

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<th>Code</th>
<th>Type</th>
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<th>Lecture / Practice (VÜ)</th>
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<tr>
<td>SS 2020</td>
<td>2182712</td>
<td>Nanotribology and -Mechanics</td>
<td>2</td>
<td>Lecture / Practice (VÜ)</td>
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<td>WS 20/21</td>
<td>2182712</td>
<td>Nanotribology and -Mechanics</td>
<td>2</td>
<td>Block (B)</td>
<td>Dienwiebel</td>
</tr>
</tbody>
</table>

**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 related to this course:*
Content
In the summer semester the lecture is offered in German and in the winter semester in English!

Part 1: Fundamentals of nanotribology

- General tribology / nanotechnology
- Forces and dissipation on the nanometer scale
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Carbon-based tribosystems
- Electronic friction
- Nanotribology in liquids
- Atomic abrasion
- nanolubrication

Part 2: Topical papers
The student can

- explain the physical foundations and common models used in the field of nanotribology and nanomechanics
- describe the most important experimental methods in nanotribology
- critically evaluate scientific papers on nanotribological issues with respect to their substantial quality

preliminary knowledge in mathematics and physics recommended
regular attendance: 22.5 hours
preparation for presentation: 22.5 hours
self-study: 75 hours
presentation (40%) and oral examination (30 min, 60%)
no tools or reference materials

Organizational issues
Die Vorlesung wird auf Deutsch (SoSe) und auf Englisch (WiSe) angeboten!

Literature
Edward L. Wolf
Nanophysics and Nanotechnology, Wiley-VCH, 2006

C. Mathew Mate
Tribology on the Small Scale: A Bottom Up Approach to Friction, Lubrication, and Wear (Mesoscopic Physics and Nanotechnology)
1st Edition, Oxford University Press

Tafelbilder, Folien, Kopien von Artikeln

Nanotribology and -Mechanics
2182712, WS 20/21, 2 SWS, Language: English, Open in study portal
Content
In the summer semester the lecture is offered in German and in the winter semester in English!

Part 1: Fundamentals of nanotribology
- General tribology / nanotechnology
- Forces and dissipation on the nanometer scale
- Experimental methods (SFA, QCM, FFM)
- Prandtl-Tomlinson model
- Superlubricity
- Carbon-based tribosystems
- Electronic friction
- Nanotribology in liquids
- Atomic abrasion
- Nanolubrication

Part 2: Topical papers
The student can
- explain the physical foundations and common models used in the field of nanotribology and nanomechanics
- describe the most important experimental methods in nanotribology
- critically evaluate scientific papers on nanotribological issues with respect to their substantial quality

preliminary knowledge in mathematics and physics recommended

regular attendance: 22.5 hours
preparation for presentation: 22.5 hours
self-study: 75 hours
presentation (40%) and oral examination (30 min, 60%)
no tools or reference materials

Organizational issues
Anmeldung per Email bis zum 12.10.2020 an den Dozenten: martin.dienwiebel@kit.edu

Literature
Tafelbilder, Folien, Kopien von Artikeln
### Course: Nature-Inspired Optimization Methods [T-WIWI-102679]

**Responsible:** Dr. rer. nat. Pradyumn Kumar Shukla

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 2

#### Events

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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 related to this course:

### Nature-Inspired Optimization Methods

2511106, SS 2020, 2 SWS, Language: English, Open in study portal

#### Content

Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

#### Learning objectives:

Students learn:

- Different nature-inspired methods: local search, simulated annealing, tabu search, evolutionary algorithms, ant colony optimization, particle swarm optimization
- Different aspects and limitation of the methods
- Applications of such methods
- Multi-objective optimization methods
- Constraint handling methods
- Different aspects in parallelization and computing platforms

#### Literature

* E. Bonabeau, M. Dorigo, G. Theraulaz: 'Swarm Intelligence'. Oxford University Press, 1999  
* A. E. Eiben, J. E. Smith: 'Introduction to Evolutionary Computation'. Bradford Book, 2004  
* Springer, 2003
7.264 Course: Non- and Semiparametrics [T-WIWI-103126]

**Responsible:** Prof. Dr. Melanie Schienle

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

**Part of:**
- M-WIWI-101638 - Econometrics and Statistics I
- M-WIWI-101639 - Econometrics and Statistics II

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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
7.265 Course: Nonlinear Optimization I [T-WIWI-102724]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:** M-WIWI-101473 - Mathematical Programming

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<td>2550112</td>
<td>Exercises Nonlinear Optimization I + II</td>
<td>SWS</td>
<td>Practice (Ü)</td>
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<td>2550142</td>
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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 the semester of the lecture and in the following semester.

The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

**Prerequisites**

The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

**Annotation**

Part I and II of the lecture are held consecutively in the same semester.

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

---

**Nonlinear Optimization I**  
2550111, WS 20/21, 2 SWS, Language: German, [Open in study portal]

**Content**

The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality conditions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

**Remark:**

The treatment of optimization problems with constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively in the same semester.

**Learning objectives:**

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.
Literature
O. Stein, Grundzüge der Nichtlinearen Optimierung, SpringerSpektrum, 2018

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
### 7.266 Course: Nonlinear Optimization I and II [T-WIWI-103637]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101473 - Mathematical Programming

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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 and possibly of a compulsory prerequisite.

The exam takes place in the semester of the lecture and in the following semester.

#### Prerequisites

None.

#### Annotation

Part I and II of the lecture are held consecutively in the same semester.

---

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

### Nonlinear Optimization I

**2550111, WS 20/21, 2 SWS, Language: German, Open in study portal**

**Lecture (V)**

#### Content

The lecture treats the minimization of smooth nonlinear functions without constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality conditions
- Algorithms (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

#### Remark:

The treatment of optimization problems with constraints forms the contents of the lecture "Nonlinear Optimization II". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively in the same semester.

#### Learning objectives:

The student

- knows and understands fundamentals of unconstrained nonlinear optimization,
- is able to choose, design and apply modern techniques of unconstrained nonlinear optimization in practice.
**Content**

The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

**Remark:**

The treatment of optimization problems without constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively in the same semester.

**Learning objectives:**

The student

- knows and understands fundamentals of constrained nonlinear optimization.
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.

**Literature**

O. Stein, Grundzüge der Nichtlinearen Optimierung, SpringerSpektrum, 2018

**Weiterführende Literatur:**

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
Course: Nonlinear Optimization II [T-WIWI-102725]

7.267

Responsible: Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101473 - Mathematical Programming

Type
Written examination

Credits
4.5

Recurrence
Each winter term

Version
3

Events

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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 I [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

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

Nonlinear Optimization II
2550113, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, optimality conditions are derived and, based on them, solution algorithms are developed. The lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions
- Algorithms (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:
The treatment of optimization problems without constraints forms the contents of the lecture "Nonlinear Optimization I". The lectures "Nonlinear Optimization I" and "Nonlinear Optimization II" are held consecutively in the same semester.

Learning objectives:
The student

- knows and understands fundamentals of constrained nonlinear optimization,
- is able to choose, design and apply modern techniques of constrained nonlinear optimization in practice.
Literature
O. Stein, Grundzüge der Nichtlinearen Optimierung, SpringerSpektrum, 2018

Weiterführende Literatur:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
7.268 Course: Novel Actuators and Sensors [T-MACH-102152]

Responsible: Prof. Dr. Manfred Kohl  
Dr. Martin Sommer

Organisation: KIT Department of Mechanical Engineering

Part of:  
M-MACH-101287 - Microsystem Technology  
M-MACH-101294 - Nanotechnology  
M-MACH-101295 - Optoelectronics and Optical Communication

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Competence Certificate  
written exam, 60 minutes

Prerequisites  
one

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

Novel actuators and sensors  
2141865, WS 20/21, 2 SWS, Language: German, Open in study portal

Literature
- Vorlesungsskript "Neue Aktoren" und Folienskript "Sensoren"  
- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007  
Course: Operation Methods for Earthmoving [T-BGU-101801]

**Responsible:** Dr.-Ing. Heinrich Schlick

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

**Part of:** M-BGU-101110 - Process Engineering in Construction

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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
### 7.270 Course: Operation Methods for Foundation and Marine Construction [T-BGU-101832]

**Responsible:** Dr.-Ing. Harald Schneider  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101110 - Process Engineering in Construction

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**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 60 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**
None

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

**Annotation**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dolior.kit.edu/english/Courses.php.

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

**Operations Research in Health Care Management**  
2550495, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Literature**

Weiterführende Literatur:

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
Course: Operations Research in Supply Chain Management [T-WIWI-102715]

**Responsible:** Prof. Dr. Stefan Nickel

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102805 - Service Operations
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

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**Competence Certificate**

The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**

None

**Recommendation**

Basic knowledge as conveyed in the module Introduction to Operations Research and in the lectures Facility Location and Strategic SCM, Tactical and operational SCMs 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 related to this course:*

**Operations Research in Supply Chain Management**

Closed study portal

**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.
Literature

- Dyckhoff, H.; Finke, U.: Cutting and Packing in Production and Distribution - A Typology and Bibliography, Physica-Verlag, 1992
### 7.273 Course: Optical Transmitters and Receivers [T-ETIT-100639]

**Responsible:** Prof. Dr. Wolfgang Freude  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** M-MACH-101295 - Optoelectronics and Optical Communication

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**Prerequisites**  
none
### 7.274 Course: Optical Waveguides and Fibers [T-ETIT-101945]

**Responsible:** Prof. Dr.-Ing. Christian Koos

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

**Part of:**
- M-MACH-101292 - Microoptics
- M-MACH-101295 - Optoelectronics and Optical Communication

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<td>Practice (Ü) Koos</td>
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**Prerequisites**
none
7.275 Course: Optimization Models and Applications [T-WIWI-110162]

**Responsible:** Dr. Nathan Sudermann-Merx

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

<table>
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**Events**

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<tr>
<td>WS 20/21</td>
<td>2550140</td>
<td>Optimization Models and Application</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Sudermann-Merx</td>
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**Competence Certificate**
The examination will take place for the last time in the winter semester 2020/2021.
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.
The prerequisite for participation in the exam is the achievement of a minimum number of points in delivery sheets. Details will be announced at the beginning of the course.

**Prerequisites**
None.

**Annotation**
The course will take place for the last time in the winter semester 20/21.
Course: Optimization under Uncertainty [T-WIWI-106545]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103289 - Stochastic Optimization

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Events

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<td>2550464</td>
<td>Optimierungsansätze unter Unsicherheit</td>
<td>SWS</td>
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<td>Rebennack</td>
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<td>2550465</td>
<td>Übungen zu Optimierungsansätze unter Unsicherheit</td>
<td>SWS</td>
<td>Practice (Ü)</td>
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<td>2550466</td>
<td></td>
<td>2 SWS</td>
<td>Practice (Ü)</td>
<td>Rebennack, Füllner</td>
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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.
### 7.277 Course: Optoelectronic Components [T-ETIT-101907]

**Responsible:** Prof. Dr. Wolfgang Freude  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** M-MACH-101287 - Microsystem Technology

<table>
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<td>Optoelectronic Components (Tutorial)</td>
<td>1 SWS</td>
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**Prerequisites**  
none
### 7.278 Course: Panel Data [T-WIWI-103127]

**Responsible:** apl. Prof. Dr. Wolf-Dieter Heller  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101638 - Econometrics and Statistics I  
M-WIWI-101639 - Econometrics and Statistics II  

**Type**  
Written examination  

**Credits**  
4.5  

**Recurrence**  
Each summer term  

**Version**  
1  

**Events**

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<td>Heller</td>
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</table>

**Prerequisites**  
None

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

#### Panel Data

**2520320, SS 2020, 2 SWS, Language: German, Open in study portal**

**Content**

**Content:**

Fixed-Effects-Models, Random-Effects-Models, Time-Demeaning

**Workload:**

Total workload for 4.5 CP: approx. 135 hours  
Attendance: 30 hours  
Preparation and follow-up: 65 hours  
Exam preparation: 40 hours  
Exam preparation: 40 hours

**Literature**

Course: Parametric Optimization [T-WIWI-102855]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:** M-WIWI-101473 - Mathematical Programming

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<tr>
<td>WS 20/21</td>
<td>2550115</td>
<td>Parametric Optimization</td>
<td>2</td>
<td>Lecture (V)</td>
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<td>WS 20/21</td>
<td>2550116</td>
<td>Übung zu Parametrische Optimierung</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>Stein, Neumann</td>
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</table>

**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 related to this course:

**V Parametric Optimization**

2550115, WS 20/21, 2 SWS, Language: German, Open in study portal

**Content**

Parametric optimization deals with the influence of parameters on the solution of optimization problems. In optimization practice, such investigations play a fundamental role in order to be able to assess the quality of a numerically obtained solution or to make quantitative statements about its parameter dependence. Furthermore, a number of parametric optimization methods exist, and parametric problems occur in applications such as game theory, geometric optimization problems, and robust optimization. The lecture gives a mathematically sound introduction to these topics and is structured as follows:

- Introductory examples and terminology
- Sensitivity
- Stability and regularity conditions
- Applications: semi-infinite optimization and Nash games

**Remark:**

Prior to the attendance of this lecture, it is strongly recommend to acquire basic knowledge on optimization problems in one of the lectures "Global Optimization I and II" and "Nonlinear Optimization I and II".

**Learning objectives:**

The student

- knows and understands the fundamentals of parametric optimization,
- is able to choose, design and apply modern techniques of parametric optimization in practice.

**Organizational issues**

donnerstags 9:45-11:15 Uhr
Literature

### Course: Patent Law [T-INFO-101310]

**Responsible:** Markus Hössle  
Matthias Koch

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101215 - Intellectual Property Law

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<td>Hössle, Koch</td>
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2 SWS
7.281 Course: Personalization and Services [T-WIWI-102848]

**Responsibility:** 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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<td>Personalization &amp; Services</td>
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<td>Sonnenbichler, Geyer-Schulz</td>
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<td>WS 20/21</td>
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<td>Exercise Personalization &amp; Services</td>
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<td>Sonnenbichler, Geyer-Schulz</td>
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</table>

**Competence Certificate**

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**

None

**Recommendation**

None

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

**Personalization & Services**

2540533, WS 20/21, 2 SWS, Language: German, [Open in study portal]

**Literature**

Die Vorlesung orientiert sich an aktuellen wissenschaftlichen Veröffentlichungen. Die Literaturliste finden Sie nach Themen gegliedert jeweils am Ende der Vorlesungseinheiten.
7 COURSES

Course: PH APL-ING-TL01 [T-WIWI-106291]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

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Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020
7.283 Course: PH APL-ING-TL02 [T-WIWI-106292]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

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7.284 Course: PH APL-ING-TL03 [T-WIWI-106293]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

- Type: Examination of another type
- Credits: 3
- Recurrence: Once
- Version: 1

Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020
### 7.285 Course: PH APL-ING-TL04 ub [T-WIWI-106294]

**Organisation:** University  
**Part of:** M-WIWI-101404 - Extracurricular Module in Engineering

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### 7.286 Course: PH APL-ING-TL05 ub [T-WIWI-106295]

**Organisation:** University  
**Part of:** M-WIWI-101404 - Extracurricular Module in Engineering

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### 7.287 Course: PH APL-ING-TL06 ub [T WIWI-106296]

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Course: PH APL-ING-TL07 [T-WIWI-108384]

Organisation: University
Part of: M-WIWI-101404 - Extracurricular Module in Engineering

Type: Examination of another type
Credits: 3
Recurrence: Once
Version: 1
### 7.29 Course: Physical Basics of Laser Technology [T-MACH-102102]

**Responsible:** Dr.-Ing. Johannes Schneider  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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<td>2181612</td>
<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Schneider</td>
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**Competence Certificate**  
oral examination (30 min)

**Prerequisites**  
It is not possible to combine this brick with brick Laser Application in Automotive Engineering [T-MACH-105164] and brick Physical Basics of Laser Technology [T-MACH-109084]

**Recommendation**  
Basic knowledge of physics, chemistry and material science

_Below you will find excerpts from events related to this course:_

<table>
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<th>Credits</th>
<th>Recurrence</th>
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<td>Physical basics of laser technology</td>
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<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Schneider</td>
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</table>
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.
The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of different laser sources.
- can describe the influence of laser, material and process parameters for the most important methods of laser-based materials processing and choose laser sources suitable for specific applications.
- can illustrate the possible applications of laser sources in measurement and medicine technology
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Basic knowledge of physics, chemistry and material science is assumed.

regular attendance: 33.5 hours
self-study: 116.5 hours

The assessment consists of an oral exam (ca. 30 min) taking place at the agreed date (according to Section 4(2), 2 of the examination regulation). The re-examination is offered upon agreement.

It is allowed to select only one of the lectures "Laser in automotive engineering" (2182642) or "Physical basics of laser technology" (2181612) during the Bachelor and Master studies.

Organizational issues
Termine für die Übung werden in der Vorlesung bekannt gegeben!

Literature
R. Poprawe: Lasertechnik für die Fertigung, 2005, Springer
7.290 Course: Physics for Engineers [T-MACH-100530]

**Responsible:**  
Prof. Dr. Martin Dienwiebel  
Prof. Dr. Peter Gumbsch  
apl. Prof. Dr. Alexander Nesterov-Müller  
Dr. Daniel Weygand

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-MACH-101287 - Microsystem Technology  
M-MACH-101291 - Microfabrication

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<td>Weygand, Dienwiebel, Nesterov-Müller, Gumbsch</td>
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**Competence Certificate**  
written exam 90 min

**Prerequisites**  
one

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

**Physics for Engineers**  
2142890, SS 2020, 2 SWS, Language: German, Open in study portal  
Lecture (V)
Content
1) Foundations of solid state physics
   - Wave particle dualism
   - Tunnelling
   - Schrödinger equation
   - H-atom

2) Electrical conductivity of solids
   - solid state: periodic potentials
   - Pauli Principle
   - band structure
   - metals, semiconductors and isolators
   - p-n junction / diode

3) Optics
   - quantum mechanical principles of the laser
   - linear optics
   - non-linear optics

Exercises (2142891, 2 SWS) are used for complementing and deepening the contents of the lecture as well as for answering more extensive questions raised by the students and for testing progress in learning of the topics.

The student
   - has the basic understanding of the physical foundations to explain the relationship between the quantum mechanical principles and the optical as well as electrical properties of materials
   - can describe the fundamental experiments, which allow the illustration of these principles

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises 2142891)
self-study: 97,5 hours and 49 hours (excerises 2142891)
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Literature
   - Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
   - Harris, Moderne Physik, Pearson Verlag, 2013
7.291 Course: Planning and Management of Industrial Plants [T-WIWI-102631]

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

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

**Part of:** M-WIWI-101471 - Industrial Production II

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<td>Planning and Management of Industrial Plants</td>
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<td>Lecture (V)</td>
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<td>WS 20/21</td>
<td>2581953</td>
<td>Übungen Anlagenwirtschaft</td>
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<td>Practice (Ü)</td>
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<td>Glöser-Chahoud, Heck, Heinzmann</td>
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</table>

**Competence Certificate**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

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

**Planning and Management of Industrial Plants**
2581952, WS 20/21, 2 SWS, Language: German, Open in study portal

**Content**
Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.

During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

**Literature**
Wird in der Veranstaltung bekannt gegeben.
Course: PLM for Product Development in Mechatronics [T-MACH-102181]

**Responsible:** Prof. Dr.-Ing. Martin Eigner

**Organisation:** KIT Department of Mechanical Engineering

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

**Type**
- Oral examination

**Credits**
- 4

**Recurrence**
- Each summer term

**Version**
- 1

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<th>2122376</th>
<th>PLM for product development in mechatronics</th>
<th>SWS</th>
<th>Lecture (V)</th>
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<td>SWS</td>
<td>Lecture (V)</td>
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**Competence Certificate**
Oral examination 20 min.

**Prerequisites**
none

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

**PLM for product development in mechatronics**
2122376, SS 2020, SWS, Language: German, [Open in study portal](#)

**Content**
Students are able to

- compare product data management and product lifecycle management.
- describe the components and core functions of a PLM solution
- explain trends from research and practice in the field of PLM for mechatronic product development

**Organizational issues**
Blockveranstaltung

**Literature**
Vorlesungsfolien / lecture slides

**PLM for product development in mechatronics**
2122376, WS 20/21, SWS, Language: German, [Open in study portal](#)

**Content**
Students are able to

- compare product data management and product lifecycle management.
- describe the components and core functions of a PLM solution
- explain trends from research and practice in the field of PLM for mechatronic product development

**Organizational issues**
Blockveranstaltung, Zeit und Ort siehe Homepage oder ILIAS zur Lehrveranstaltung.

**Literature**
Vorlesungsfolien / lecture slides
7.293 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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**Events**

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<td>Project (PRO)</td>
<td>Ovtcharova, Mitarbeiter</td>
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**Competence Certificate**  
Alternative exam assessment (graded)

**Prerequisites**  
None

**Annotation**  
Number of participants is limited, compulsory attendance

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

**PLM-CAD Workshop**
2121357, SS 2020, 4 SWS, Language: German, [Open in study portal]

**Content**
The aim of the workshop is to demonstrate the benefits of collaborative product development using PLM methods and to emphasize their added value compared to classical CAD development.

Students learn how to develop and produce a prototype with the help of modern PLM and CAx systems.

**Organizational issues**

**Literature**
Workshop-Unterlagen / workshop materials

**PLM-CAD Workshop**
2121357, WS 20/21, 4 SWS, Language: German, [Open in study portal]

**Content**
The aim of the workshop is to demonstrate the benefits of collaborative product development using PLM methods and to emphasize their added value compared to classical CAD development.

Students learn how to develop and produce a prototype with the help of modern PLM and CAx systems.

**Organizational issues**

**Literature**
Workshop-Unterlagen / workshop materials
7.294 Course: Plug-and-Play Material Handling [T-MACH-106693]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-104888 - Advanced Module Logistics

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**Competence Certificate**
Presentation of the four steps of the course content (design, implementation, test concept and evaluation)

**Prerequisites**
None
# 7.295 Course: Polymer Engineering I [T-MACH-102137]

**Responsible:** Prof. Dr.-Ing. Peter Elsner  
Dr.-Ing. Wilfried Liebig

**Organisation:** KIT Department of Mechanical Engineering

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

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<td>Polymer Engineering I</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Elsner, Liebig</td>
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</table>

**Competence Certificate**

Oral exam, about 25 minutes

**Prerequisites**

none

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

## Polymer Engineering I

2173590, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Content**

1. Economical aspects of polymers  
2. Introduction of mechanical, chemical and electrical properties  
3. Processing of polymers  
   (introduction)  
4. Material science of polymers  
5. Synthesis

**Learning objectives:**

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material “polymer” meeting its requirements in an economical and ecological way.

The students

- are able to describe and classify polymers based on the fundamental synthesis processing techniques  
- can find practical applications for state-of-the-art polymers and manufacturing technologies  
- are able to apply the processing techniques, the application of polymers and polymer composites regarding to the basic principles of material science  
- can describe the special mechanical, chemical and electrical properties of polymers and correlate these properties to the chemical bindings.  
- can define application areas and the limitation in the use of polymers

**Organizational issues**

Veranstaltung findet synchron statt, Do 15.45 Uhr-17.15 Uhr, weitere Informationen siehe ILIAS

**Literature**

Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.
Course: Polymer Engineering II [T-MACH-102138]

**Responsible:** Prof. Dr.-Ing. Peter Elsner
Dr.-Ing. Wilfried Liebig

**Organisation:** KIT Department of Mechanical Engineering

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

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**Events**

| Events | Credits |  |  |  |
|--------|---------|  |  |  |
| SS 2020 | 2174596 | Polymer Engineering II | 2 SWS | Lecture (V) | Elsner, Liebig |

**Competence Certificate**

Oral exam, about 25 minutes

**Prerequisites**

none

**Recommendation**

Knowledge in Polymer engineering I

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

**Polymer Engineering II**

2174596, SS 2020, 2 SWS, Language: German, Open in study portal Lecture (V)

**Content**

1. Processing of polymers
2. Properties of polymer components
   - Based on practical examples and components
   - 2.1 Selection of material
   - 2.2 Component design
   - 2.3 Tool engineering
   - 2.4 Production technology
   - 2.5 Surface engineering
   - 2.6 Sustainability, recycling

**learning objectives:**

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, that the students gather knowledge and technical skills to use the material "polymer" meeting its requirements in an economical and ecological way.

The students

- can describe and classify different processing techniques
- and can exemplify mould design principles based on technical parts.
- know about practical applications and processing of polymer parts
- are able to design polymer parts according to given restrictions
- can choose appropriate polymers based on the technical requirements
- can decide how to use polymers regarding the production, economical and ecological requirements

**requirements:**

Polymer engineering I

**workload:**

The workload for the lecture Polymerengineering II is 120 h per semester and consists of the presence during the lecture (21 h) as well as preparation and rework time at home (99 h).
Organizational issues

Literature
Literaturhinweise, Unterlagen und Teilmanuskript werden in der Vorlesung ausgegeben.
Recommended literature and selected official lecture notes are provided in the lecture.
Course: Polymers in MEMS A: Chemistry, Synthesis and Applications [T-MACH-102192]

Responsible: Dr.-Ing. Bastian Rapp
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101291 - Microfabrication

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<tr>
<td></td>
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<td>and Applications</td>
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</table>

Competence Certificate
Oral examination

Prerequisites
none

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

Polymers in MEMS A: Chemistry, Synthesis and Applications
2141853, WS 20/21, 2 SWS, Language: German, Open in study portal

Organizational issues
Findet als Blockveranstaltung am Semesterende statt. Anmeldungen bitte an bastian.rapp@imtek.uni-freiburg.de
7.298 Course: Polymers in MEMS B: Physics, Microstructuring and Applications [T-MACH-102191]

Responsible: Dr.-Ing. Matthias Worgull
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101291 - Microfabrication

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Events

| WS 20/21 | 2141854 | Polymers in MEMS B: Physics, Microstructuring and Applications | 2 SWS | Lecture (V) | Worgull |

Competence Certificate

Oral examination

Prerequisites

none

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

Polymers in MEMS B: Physics, Microstructuring and Applications
2141854, WS 20/21, 2 SWS, Language: German, Open in study portal
Below you will find excerpts from events related to this course:

### Polymers in MEMS C - Biopolymers and Bioplastics

#### 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.
Organizational issues
Für weitere Rückfragen, wenden Sie sich bitte an die Dozenten, Dr.-Ing. Bastian E. Rapp (bastian.rapp@kit.edu) und PD Dr.-Ing-Matthias Worgull (matthias.worgull@kit.edu). Eine Voranmeldung ist nicht notwendig.

Literature
Zusätzliche vorlesungsbegleitende Literatur ist nicht notwendig.
### 7.300 Course: Portfolio and Asset Liability Management [T-WIWI-103128]

**Responsible:** Dr. Mher Safarian  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101639 - Econometrics and Statistics II

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**Competence Certificate**

The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.).

**Prerequisites**

None

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

### Portfolio and Asset Liability Management

**2520357, SS 2020, 2 SWS, Language: English, [Open in study portal](#)**

**Lecture (V)**

**Content**

**Learning objectives:**

Knowledge of various portfolio management techniques in the financial industry.

**Content:**

Portofolio theory: principles of investment, Markowitz-portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitrage pricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

**Workload:**

Total workload for 4.5 CP: approx. 135 hours  
Attendance: 30 hours  
Preparation and follow-up: 65 hours  
Exam preparation: 40 hours  
Exam preparation: 40 hours

**Organizational issues**

Blockveranstaltung

**Literature**

To be announced in the lecture
### 7.301 Course: Power Network [T-ETIT-100830]

**Responsible:** Prof. Dr.-Ing. Thomas Leibfried  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** M-ETIT-101164 - Generation and Transmission of Renewable Power

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<td>Practice (Ü)</td>
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### 7.302 Course: Power Transmission and Power Network Control [T-ETIT-101941]

**Responsible:** Prof. Dr.-Ing. Thomas Leibfried  
**Organisation:** KIT Department of Electrical Engineering and Information Technology  
**Part of:** M-ETIT-101164 - Generation and Transmission of Renewable Power  

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**Prerequisites**  
none
### 7.303 Course: Practical Course Polymers in MEMS [T-MACH-105556]

- **Responsible:** Dr.-Ing. Bastian Rapp  
  Dr.-Ing. Matthias Worgull
- **Organisation:** KIT Department of Mechanical Engineering
- **Part of:** M-MACH-101291 - Microfabrication

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#### Events

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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 related to this course:

### Practical Course Polymers in MEMS

2142856, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

#### 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.

#### Organizational issues

Anmeldung und Terminabsprache in der Vorlesung (2142855)

Für weitere Rückfragen, wenden Sie sich bitte an die Dozenten, Dr.-Ing. Bastian E. Rapp (bastian.rapp@kit.edu) und PD Dr.-Ing.-Matthias Worgull (matthias.worgull@kit.edu). Eine Voranmeldung ist notwendig. Die Platzanzahl ist auf 5 Teilnehmer beschränkt.

#### Literature

Vorlesungsunterlagen, dort empfohlene Literatur
### 7.304 Course: Practical Course Technical Ceramics [T-MACH-105178]

**Responsible:** Dr. Günter Schell  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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**Competence Certificate**  
Colloquium and laboratory report for the respective experiments.

**Prerequisites**  
none

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

**Practical Course Technical Ceramics**  
2125751, WS 20/21, 2 SWS, Language: German, Open in study portal

**Organizational issues**  
Das Praktikum wird im WS 2020/2021 nicht angeboten.

**Literature**  

Richerson, D. R.: Modern Ceramic Engineering, CRC Taylor & Francis, 2006
7.305 Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102808 - Digital Service Systems in Industry

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<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 related to this course:

| V Practical Seminar: Information Systems & Service Design (Master) |
| 2540554, SS 2020, 3 SWS, Open in study portal |

Content

In this practical seminar, students get an individual assignment and develop a running software prototype. Beside the software prototype, the students also deliver a written documentation.

Prerequisites

Profound skills in software development are required

Literature

Further literature will be made available in the seminar.
**Course: Practical Seminar: Advanced Analytics [T-WWI-108765]**

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

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

**Part of:** M-WWI-103118 - Data Science: Data-Driven User Modeling

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<td>Examination of another type</td>
<td>4,5</td>
<td>Each term</td>
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**Competence Certificate**

The assessment consists of practical work in the field of advanced analytics, a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

**Prerequisites**

None

**Recommendation**

At least one module offered by the institute should have been chosen before attending this seminar.

**Annotation**

The course is held in English. The course is not offered regularly.
# 7.307 Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

**Responsible:** Prof. Dr. Alexander Mädche  
Prof. Dr. Gerhard Satzger  
Prof. Dr. Thomas Setzer  
Prof. Dr. Christof Weinhardt

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

**Part of:** M-WIWI-103117 - Data Science: Data-Driven Information Systems

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<td>Irregular</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**  
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.
7.308 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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**Events**

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<th>Code</th>
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<th>SWS</th>
<th>Practical course (P)</th>
<th>Nickel, Mitarbeiter</th>
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</thead>
<tbody>
<tr>
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<td>2550498</td>
<td>Practical seminar: Health Care Management</td>
<td>3 SWS</td>
<td>Practical course (P)</td>
<td>Nickel, Mitarbeiter</td>
</tr>
</tbody>
</table>

**Competence Certificate**

Due to a research semester of Professor Nickel in WS 19/20, the courses Location Planning and Strategic SCM and Practice Seminar: Health Care Management do NOT take place in WS 19/20. Please also refer to the information at https://dol.ior.kit.edu/Lehrveranstaltungen.php for further details.

The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

**Prerequisites**

None.

**Recommendation**

Basic knowledge as conveyed in the module Introduction 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.
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

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<th>Practical Seminar: Information Systems &amp; Service Design (Master)</th>
<th>3 SWS</th>
<th>Lecture (V)</th>
<th>Mädche</th>
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</table>

**Type:** Examination of another type  
**Credits:** 4.5  
**Recurrence:** Each term  
**Version:** 2

**Competence Certificate**

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

**Prerequisites**
None.

**Recommendation**
Attending the course „Digital Service Design” is recommended, but not mandatory.

**Annotation**
The course is held in English.

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

**Practical Seminar: Information Systems & Service Design (Master)**

2540554, SS 2020, 3 SWS, [Open in study portal]

**Content**
In this practical seminar, students get an individual assignment and develop a running software prototype. Beside the software prototype, the students also deliver a written documentation.

**Prerequisites**
Profound skills in software development are required

**Literature**
Further literature will be made available in the seminar.
7.310 Course: Practical Seminar: Service Innovation [T-WIWI-110887]

**Responsible:** Prof. Dr. Gerhard Satzger

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

**Part of:**
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-102806 - Service Innovation, Design & Engineering

**Type:** Examination of another type

**Credits:** 4.5

**Recurrence:** Irregular

**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**
None

**Recommendation**
Knowledge of Service Innovation Methods is assumed. Therefore it is recommended to attend the course Service Innovation [2540468] beforehand.

**Annotation**
Due to the project work, the number of participants is limited and participation requires knowledge about models, concepts and approaches that are taught in the Service Innovation lecture. Having taken the Service Innovation lecture or demonstrating equivalent knowledge is a prerequisite for participating in this Practical Seminar. Details for registration will be announced on the web pages for this course.

The seminar is not offered regularly.
7.311 Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

**Responsible:** Dr. Arndt Last  
**Organisation:** KIT Department of Mechanical Engineering

**Part of:**  
M-ETIT-101158 - Sensor Technology I  
M-MACH-101287 - Microsystem Technology  
M-MACH-101290 - BioMEMS  
M-MACH-101291 - Microfabrication  
M-MACH-101292 - Microoptics  
M-MACH-101294 - Nanotechnology

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<tr>
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<td>3</td>
<td>Each term</td>
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</table>

**Competence Certificate**  
The assessment consists of a written exam

**Prerequisites**  
none

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

**Introduction to Microsystem Technology - Practical Course**  
2143875, SS 2020, 2 SWS, Language: German, [Open in study portal]

**Content**  
In the practical training includes nine experiments:  
1. Hot embossing of plastics micro structures  
2. Micro electroforming  
3. Mikro optics: "LIGA-micro spectrometer"  
4. UV-lithography  
5. Optical waveguides  
6. Capillary electrophoresis on a chip  
7. SAW gas sensor  
8. Metrology  
9. Atomic force microscopy  
Each student takes part in only five experiments.  
The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

**Organizational issues**  
Teilnahmeanfragen an Frau Nowotny, marie.nowotny@kit.edu

**Literature**  
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997  
Unterlagen zum Praktikum zur Vorlesung 'Grundlagen der Mikrosystemtechnik'
Introduction to Microsystem Technology - Practical Course
2143877, SS 2020, 2 SWS, Language: German, Open in study portal

Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
3. Mikro optics: "LIGA-micro spectrometer"
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
9. Atomic force microscopy
Each student takes part in only five experiments.
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Organizational issues
Teilnahmeanfragen an Frau Nowotny, marie.nowotny@kit.edu

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung 'Grundlagen der Mikrosystemtechnik'

Introduction to Microsystem Technology - Practical Course
2143875, WS 20/21, 2 SWS, Language: German, Open in study portal

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung 'Grundlagen der Mikrosystemtechnik'

Introduction to Microsystem Technology - Practical Course
2143877, WS 20/21, 2 SWS, Language: German, Open in study portal

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung 'Grundlagen der Mikrosystemtechnik'
7.312 Course: Predictive Mechanism and Market Design [T-WIWI-102862]

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

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

**Part of:**
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-101505 - Experimental Economics

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<td>Irregular</td>
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</tbody>
</table>

**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.
### 7.313 Course: Predictive Modeling [T-WIWI-110868]

**Responsible:** Jun.-Prof. Dr. Fabian Krüger  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101638 - Econometrics and Statistics I  
M-WIWI-101639 - Econometrics and Statistics II

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**Events**

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<th>Course Code</th>
<th>Course Name</th>
<th>SWS</th>
<th>Type</th>
<th>Language</th>
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<tr>
<td>SS 2020</td>
<td>2521311</td>
<td>Predictive Modeling</td>
<td>2</td>
<td>Lecture (V)</td>
<td>English</td>
<td>Krüger</td>
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<tr>
<td>SS 2020</td>
<td>2521312</td>
<td>Predictive Modeling (Tutorial)</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>English</td>
<td>Krüger</td>
</tr>
</tbody>
</table>

**Competence Certificate**

Written assignment (“Take-Home Assignment”) and oral examination (approx. 20 minutes, possibly via video conference) on the content of the assignment. Details will be announced in the lecture.

**Prerequisites**

None

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

**Predictive Modeling**

2521311, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Literature**

- Weitere Literatur wird in der Vorlesung bekanntgegeben.

**Predictive Modeling (Tutorial)**

2521312, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
7.314 Course: Price Management [T-WIWI-105946]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Dr Paul Glenn

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101409 - Electronic Markets

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Events

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<th>2540529</th>
<th>Price Management</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Glenn</th>
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<tbody>
<tr>
<td>SS 2020</td>
<td>2540530</td>
<td>Exercise Price Management</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Glenn</td>
</tr>
</tbody>
</table>

Competence Certificate

Lecture and exam will not be offered in summer semester 2019. The next examination is in the summer semester 2020.

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites

None

Recommendation

None

Annotation

The lecture is offered for the first time in summer term 2016.

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

V Price Management
2540529, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Literature

7.315 Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

Responsible: Prof. Dr. Martin Klarmann
Mark Schröder

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-105312 - Marketing and Sales Management

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<th>Type</th>
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<tr>
<td>Examination of another type</td>
<td>1.5</td>
<td>Each winter term</td>
<td>3</td>
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</table>

Competence Certificate
This alternative exam assessment consists of a presentation with a subsequent discussion totalling 25 minutes. Moreover learning contents are checked by realistic 30-minute price negotiations.

Prerequisites
None

Recommendation
None

Annotation
Please note that the workshop "Price Negotiation and Sales Presentations" as well as all other 1.5-ECTS courses will not take place in the winter term 20/21 due to a research semester. The course will probably be offered again starting in WS21/22. Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed. For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu). Please note that only one of the courses from the election block can be attended in the module.
7.316 Course: Pricing [T-WIWI-102883]

**Responsible:** Dr. Sven Feurer

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

**Part of:**
- M-WIWI-101510 - Cross-Functional Management Accounting
- M-WIWI-105312 - Marketing and Sales Management

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<td>see Annotations</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

**Recommendation**
None

**Annotation**
Examination offer is discontinued. Last examination date 09.05.2020 for candidates with open retake exams and for first-time writers. For the latter, a repeat examination may be offered in case of a failed attempt (and only then) in SoSe 2020.
7 COURSES

Course: Principles of Ceramic and Powder Metallurgy Processing [T-MACH-102111]

Responsible: Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

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

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Events

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<td>WS 20/21</td>
<td>2193010</td>
<td>Basic principles of powder metallurgical and ceramic processing</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Schell</td>
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</table>

Competence Certificate

The assessment consists of an oral exam (20-30 min) taking place at the agreed date. The re-examination is offered upon agreement.

Prerequisites
none

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

Basic principles of powder metallurgical and ceramic processing
2193010, WS 20/21, 2 SWS, Language: German, Open in study portal

Organizational issues
Die Veranstaltung findet in Geb. 10.91 (Oberer Hörsaal) oder online statt.
Erster Termin: 05.11.2020

Literature

- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
7.318 Course: Principles of Food Process Engineering [T-CIWVT-101874]

**Responsible:** Dr. Volker Gaukel

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

**Part of:** M-CIWVT-101120 - Principles of Food Process Engineering

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<td>Lecture (V)</td>
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<td>Vertiefung verfahrenstechnischer Grundlagen am Beispiel Lebensmittel</td>
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<td>Lecture (V)</td>
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<td>Verfahrenstechnische Grundlagen am Beispiel der Lebensmittelverarbeitung (für LmCh, WiWi)</td>
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**Prerequisites**

none
### 7.319 Course: Process Engineering [T-BGU-101844]

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<tr>
<th>Responsible</th>
<th>Dr.-Ing. Harald Schneider</th>
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<tr>
<td>Organisation</td>
<td>KIT Department of Civil Engineering, Geo- and Environmental Sciences</td>
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<tr>
<td>Part of</td>
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<td>Lecture (V)</td>
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<td>Schneider, Gentes</td>
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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7.320 Course: Process Mining [T-WIWI-109799]

**Responsible:** Prof. Dr. Andreas Oberweis

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 2

### Events

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<td>Lecture (V)</td>
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<td>2511205</td>
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<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Oberweis, Schreiber</td>
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</table>

**Competence Certificate**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**
None

**Annotation**
Former name (up to winter semester 2018/1019) "Workflow Management".

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

**V Process Mining**
2511204, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Content**
The area of process mining covers approaches which aim at deducting new knowledge on the basis of logfiles generated by information systems. Such information systems are e.g., workflow-management-systems which are used for an efficient control of processes in enterprises and organisations. The lecture introduces the foundations of processes and respective modeling and analysis techniques. In the following, the foundations of process mining and the three classical types of approaches - discovery, conformance and enhancement - will be taught. In addition to the theoretical basics, tools, application scenarios in practice and open research questions are covered as well.

**Learning objectives:**
Students
- understand the concepts and approaches of process mining and know how they are applied,
- create and evaluate business process models,
- analyze static and dynamic properties of workflows,
- apply approaches and tools of process mining.

**Recommendations:**
Knowledge of course Applied Informatics - Modelling is expected.

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


Weitere Literatur wird in der Vorlesung bekannt gegeben.
7 COURSES

Course: Product and Innovation Management [T-WIWI-109864]

7.321 Course: Product and Innovation Management [T-WIWI-109864]

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

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

**Part of:**
- M-WIWI-101510 - Cross-Functional Management Accounting
- M-WIWI-101514 - Innovation Economics
- M-WIWI-105312 - Marketing and Sales Management

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<tr>
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<td>Each summer term</td>
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**Events**

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<th>Course and Innovation Management</th>
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<th>Lecture (V)</th>
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<td></td>
<td>2571154</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

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

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

**Product and Innovation Management**

2571154, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Content**

This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

**Students**
- know the most important terms of the product and innovation concept
- understand the models of product choice behavior (e.g., the Markov model, the Luce model)
- are familiar with the basics of network theory (e.g. the Triadic Closure concept)
- know the central strategic concepts of innovation management (especially the market driving approach, pioneer and successor, Miles/Snow typology, blockbuster strategy)
- master the most important methods and sources of idea generation (e.g. open innovation, lead user method, crowdsourcing, creativity techniques, voice of the customer, innovation games, conjoint analysis, quality function deployment, online toolkits)
- are capable of defining and evaluating new product concepts and know the associated instruments like focus groups, product testing, speculative sales, test market simulation Assessor, electronic micro test market
- have advanced knowledge about market introduction (e.g. adoption and diffusion models Bass, Fourt/Woodlock, Mansfield)
- understand important connections of the innovation process (cluster formation, innovation culture, teams, stage-gate process)

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Total effort for 3 credit points: approx. 90 hours

**Presence time:** 30 hours

**Preparation and wrap-up of LV:** 45.0 hours

**Exam and exam preparation:** 15.0 hours

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

**Responsible:** Dr. Stefan Kienzle
Dr. Dieter Steegmüller

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101284 - Specialization in Production Engineering
- M-MACH-105455 - Strategic Design of Modern Production Systems

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**Events**

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<td>WS 20/21</td>
<td>2149670</td>
<td>Product- and Production-Concepts for modern Automobiles</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Steegmüller, Kienzle</td>
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**Competence Certificate**
Oral Exam (20 min)

**Prerequisites**
T-MACH-105166 - Materials and Processes for Body Lightweight Construction in the Automotive Industry must not have been started.

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

**Product- and Production-Concepts for modern Automobiles**

2149670, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)
Content
The lecture illuminates the practical challenges of modern automotive engineering. As former leaders of the automotive industry, the lecturers refer to current aspects of automotive product development and production.

The aim is to provide students with an overview of technological trends in the automotive industry. In this context, the course also focuses on changes in requirements due to new vehicle concepts, which may be caused by increased demands for individualisation, digitisation and sustainability. The challenges that arise in this context will be examined from both a production technology and product development perspective and will be illustrated with practical examples thanks to the many years of industrial experience of both lecturers.

The topics covered are:

- General conditions for vehicle and body development
- Integration of new drive technologies
- Functional requirements (crash safety etc.), also for electric vehicles
- Development Process at the Interface Product & Production, CAE/Simulation
- Energy storage and supply infrastructure
- Aluminium and lightweight steel construction
- FRP and hybrid parts
- Battery, fuel cell and electric motor production
- Joining technology in modern car bodies
- Modern factories and production processes, Industry 4.0.

Learning Outcomes:
The students ...

- are able to name the presented general conditions of vehicle development and are able to discuss their influences on the final product using practical examples.
- are able to name the various lightweight approaches and identify possible areas of application.
- are able to identify the different production processes for manufacturing lightweight structures and explain their functions.
- are able to perform a process selection based on the methods and their characteristics.

Workload:
regular attendance: 25 hours
self-study: 95 hours

Organizational issues
Termine werden über Ilias bekannt gegeben.

Bei der Vorlesung handelt es sich um eine Blockveranstaltung. Eine Anmeldung über Ilias ist erforderlich.

The lecture is a block course. An application in Ilias is mandatory.

Literature

Media:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).
Course: Production and Logistics Management [T-WIWI-102632]

**Responsible:** Dr.-Ing. Simon Glöser-Chahoud  
Prof. Dr. Frank Schultmann

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

**Part of:** M-WIWI-101412 - Industrial Production III

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<td>Production and Logistics Management</td>
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<td>SS 2020</td>
<td>2581955</td>
<td>Übung zu Produktions- und Logistikmanagement</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>Zimmer, Huster</td>
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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 related to this course:

**Production and Logistics Management**
2581954, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Content**
This course covers central tasks and challenges of operative production and logistics management. Students get to know the set-up and mode of planning systems such as production planning and control systems, enterprise resource planning systems and advanced planning systems to cope with the accompanying planning tasks in supply chain management. Methods to solve these tasks from the field of operational research will be explored with respect to manufacturing program planning, material requirement planning, lot size problems and scheduling. Alongside to MRP II (Manufacturing Resources Planning), students will be introduced to integrated supply chain management approaches. Finally, commercially available planning systems will be presented and discussed.

**Literature**
Wird in der Veranstaltung bekannt gegeben.
7.324 Course: Production Technology for E-Mobility [T-MACH-110984]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer  
Janna Hofmann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101284 - Specialization in Production Engineering

| Events | | | | |
|--------|----------------|-----------------|------------------|
| SS 2020 | 2150605 | Production Technology for E-Mobility | 2 SWS | Lecture (V) | Fleischer, Hofmann |

Competence Certificate
Oral Exam 20 min

Prerequisites
none

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

Production Technology for E-Mobility
2150605, SS 2020, 2 SWS, Language: German, Open in study portal

Content
In the lecture Production Engineering for Electromobility the students should be enabled to design, select and develop production processes for the production of the components of an electric drive train (electric motor, battery cells, fuel cells) by using research-oriented teaching.

Learning Outcomes:
The students are able to:

- describe the structure and function of a fuel cell, an electric traction drive and a battery system.
- reproduce the process chains for the production of the components fuel cell, battery and electric traction drive.
- apply methodical tools to solve problems along the process chain.
- derive the challenges in the production of electric drives for electric mobility.
- describe the factors influencing the individual process steps on each other using the process chain of Li-ion battery cells.
- enumerate or describe the necessary process parameters to counteract the influencing factors of the process steps in Li-ion battery cell production.
- apply methodical tools to solve problems along the process chain for the production of Li-ion battery cells.
- derive the challenge of mounting and dismounting battery modules.
- derive the challenges in the production of fuel cells for use in mobility.

Workload:
regular attendance: 42 hours
self-study: 78 hours

Organizational issues
Die Lehrveranstaltung wird erstmalig im Sommersemester 2021 angeboten.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)
7.325 Course: Project Internship Additive Manufacturing: Development and Production of an Additive Component [T-MACH-110960]

Responsible: Dr.-Ing. Frederik Zanger
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101284 - Specialization in Production Engineering

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Events

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<td>WS 20/21</td>
<td>2149700</td>
<td>Project Internship Aditive Manufacturing: Development and Production of an Additive Component</td>
<td>2</td>
<td>Practical course (P)</td>
<td>Zanger</td>
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Competence Certificate
Alternative test achievement (graded):

- Milestone based presentation of the results in presentation form (10 min) and submitting of the presentation file with weighting 30%
- Oral exam (15 min) with weighting 40%
- Project work with weighting 30%

Prerequisites
none

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

Project Internship Aditive Manufacturing: Development and Production of an Additive Component

2149700, WS 20/21, 2 SWS, Language: German, Open in study portal
Content
The lecture “Project Internship Additive Manufacturing: Development and Production of an Additive Component” combines the basics of metallic laser powder bed fusion (LPBF) with a development project in cooperation with an industrial company. The students learn the basics of the following topics in the project-related lecture:

- Influence of different process variables on the component quality of parts produced in the LPBF process
- Preparation and simulation of the LPBF process
- Production of additive metallic components
- Process monitoring and quality assurance in additive manufacturing
- Topology optimization
- CAM for subtractive rework

The topics addressed in the course will be applied practically in various workshops on the individual topics and transferred to the developmental task in self-study. Finally, the results of the elaborations are produced additively and post-processed subtractively.

Learning Outcomes:
The students ...

- are able to describe the properties and applications of the additive manufacturing processes laser powder bed fusion (LPBF) and lithography assisted ceramic manufacturing (LCM).
- are able to select the appropriate manufacturing process for a technical application.
- are able to describe and implement the creation of a product along the entire additive process chain (CAD, simulation, work preparation, CAM) from the idea to the production.
- are able to discuss the development process for components that are optimized for additive manufacturing.
- are able to perform topology optimization.
- are able to simulate the additive process, compensate for process-related distortions and determine the ideal alignment on the building platform.
- are able to create necessary support structures for the additive process and to derive a building order file.
- are able to create a CAM model for the subtractive rework process of additive parts.

Workload:
regular attendance: 12 hours
self-study: 108 hours

Organizational issues
Termine werden über Ilias bekannt gegeben.
Bei der Vorlesung handelt es sich um eine Blockveranstaltung.
Eine Anmeldung über Ilias ist erforderlich.

Dates will be announced via Ilias.
The lecture is a block event.
A registration via Ilias is required.

Literature
Skript zur Veranstaltung wird über Ilias (https://ilias.studium.kit.edu/) bereitgestellt
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/)
7.326 Course: Project Lab Cognitive Automobiles and Robots [T-WIWI-109985]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

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<td>2513500 - Cognitive Automobiles and Robots</td>
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<td>WS 20/21</td>
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<td>2512501 - Practical Course Cognitive Automobiles and Robots (Master)</td>
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Competence Certificate
The alternative exam assessment consists of:
- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

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

Cognitive Automobiles and Robots
2513500, SS 2020, 2 SWS, Language: German/English, Open in study portal

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:
- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:
Attendance of the lecture machine learning

Workload:
The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.
Content
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:
- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

Recommendations:
Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

Workload:
The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im WiWi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.
7.327 Course: Project Lab Machine Learning [T-WIWI-109983]

**Responsible:** Prof. Dr.-Ing. Johann Marius Zöllner

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

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

**Type:** Examination of another type

**Credits:** 4.5

**Recurrence:** Each summer term

**Version:** 2

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<th>3 SWS</th>
<th>Practical course (P)</th>
<th>Zöllner</th>
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</table>

**Competence Certificate**
The alternative exam assessment consists of:
- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

**Prerequisites**
None

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

**Project Lab Machine Learning**
2512500, SS 2020, 3 SWS, Language: German/English, Open in study portal

**Practical course (P)**

**Content**
The lab is intended as a practical supplement to lectures such as "Machine Learning". The theoretical basics are applied in the lab course. The aim of the lab course is that the participants work together to design, develop and evaluate a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

In addition to the scientific objectives involved in the investigation and application of the methods, aspects of project-specific teamwork in research (from specification to presentation of the results) are also developed in this practical course.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and implementation and evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

**Learning objectives:**
- Students can practically apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles.
- Students master the analysis and solution of corresponding problems in a team.
- Students can evaluate, document and present their concepts and results.

**Recommendations:**
Attendance of the lecture machine learning, C/C++ knowledge, Python knowledge

**Workload:**
The workload of 4.5 credit points consists of the time spent in the lab for practical implementation of the selected solution, as well as the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

**Organizational issues**
Anmeldung und weitere Informationen sind im WiWi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.
7.328 Course: Project Management [T-WIWI-103134]

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

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

**Part of:**
- M-WIWI-101412 - Industrial Production III
- M-WIWI-101471 - Industrial Production II

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<td>WS 20/21</td>
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<td>Practice (Ü)</td>
<td>Volk, Wiens, Schumacher, Rosenberg, Wehrle, Gehring</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 related to this course:

**Project Management**

2581963, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

**Content**

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management
8. Stakeholder
9. Communication, Negotiation and Leadership
10. Project Controlling
11. Agile Project Management

**Literature**
Wird in der Veranstaltung bekannt gegeben.
### 7.329 Course: Project Management in Construction and Real Estate Industry I [T-BGU-103432]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101884 - Lean Management in Construction  
- M-BGU-101888 - Project Management in Construction

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<td>WS 20/21</td>
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<td>Projektmanagement in der Bau- und Immobilienwirtschaft</td>
<td>4</td>
<td>Lecture / Practice (VÜ)</td>
<td>Haghsheno, Hirschberger, Sittinger, Münzl</td>
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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
### Course: Project Management in Construction and Real Estate Industry II [T-BGU-103433]

**Type:** Written examination  
**Credits:** 3  
**Recurrence:** Each winter term  
**Version:** 1

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**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
- M-BGU-101884 - Lean Management in Construction  
- M-BGU-101888 - Project Management in Construction

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
### 7.331 Course: Project Paper Lean Construction [T-BGU-101007]

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

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

**Part of:** M-BGU-101884 - Lean Management in Construction

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<tr>
<td>Examination of another type</td>
<td>1,5</td>
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#### Events

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<td>6241901</td>
<td>Lean Construction</td>
<td>4 SWS</td>
<td>Lecture / Practice (VÜ)</td>
</tr>
</tbody>
</table>

**Competence Certificate**

- Project:
  - Report, appr. 10 pages, and presentation, appr. 10 min.

**Prerequisites**

- None

**Recommendation**

- None

**Annotation**

- None
7.332 Course: Project Studies [T-BGU-101847]

**Responsible:** Prof. Dr.-Ing. Sascha Gentes

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

**Part of:** M-BGU-101110 - Process Engineering in Construction

<table>
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**Events**

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<tr>
<td>SS 2020 6243801 Projektstudien 2 SWS</td>
<td>None</td>
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</table>

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
Course: Project Workshop: Automotive Engineering [T-MACH-102156]

**Responsible:**
Dr.-Ing. Michael Frey
Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler

**Organisation:**
KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101264 - Handling Characteristics of Motor Vehicles
- M-MACH-101265 - Vehicle Development
- M-MACH-101266 - Automotive Engineering

**Type**
Oral examination

**Credits**
4.5

**Recurrence**
Each term

**Version**
1

**Events**

<table>
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<tr>
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<th>Type</th>
<th>Credits</th>
<th>Recurrence</th>
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<tbody>
<tr>
<td>SS 2020</td>
<td>2115817</td>
<td>Project Workshop: Automotive Engineering</td>
<td>Lecture (V)</td>
<td>3 SWS</td>
<td>Gauterin, Gießler, Frey</td>
<td></td>
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<tr>
<td>WS 20/21</td>
<td>2115817</td>
<td>Project Workshop: Automotive Engineering</td>
<td>Lecture (V)</td>
<td>3 SWS</td>
<td>Gauterin, Gießler, Frey</td>
<td></td>
</tr>
</tbody>
</table>

**Competence Certificate**
Oral examination
Duration: 30 up to 40 minutes
Auxiliary means: none

**Prerequisites**
none

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

**Project Workshop: Automotive Engineering**
2115817, SS 2020, 3 SWS, Language: German, [Open in study portal](#)

**Content**
During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

**Learning Objectives:**
The students are familiar with typical industrial development processes and working style. They are able to apply knowledge gained at the university to a practical task. They are able to analyze and to judge complex relations. They are ready to work self-dependently, to apply different development methods and to work on approaches to solve a problem, to develop practice-oriented products or processes.

**Organizational issues**
Begrenzte Teilnehmerzahl mit Auswahlverfahren, die Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.
Raum und Termine: s. Aushang
7 COURSES

**Course:** Project Workshop: Automotive Engineering [T-MACH-102156]

---

**Literature**

---

Skripte werden beim Start-up Meeting ausgegeben.

---

**Project Workshop: Automotive Engineering**

<table>
<thead>
<tr>
<th>Lecture (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2115817, WS 20/21, 3 SWS, Language: German, <a href="#">Open in study portal</a></td>
</tr>
</tbody>
</table>

---

**Content**

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

**Learning Objectives:**

During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

**Organizational issues**

Begrenzte Teilnehmerzahl mit Auswahlverfahren, in deutscher Sprache. Bewerbungen sind am Ende des vorhergehenden Semesters einzureichen.

Termin und Raum: siehe Institutshomepage.

Limited number of participants with selection procedure, in German language. Please send the application at the end of the previous semester

Date and room: see homepage of institute.

---

**Literature**

---

Skripte werden beim Start-up Meeting ausgegeben.

The scripts will be supplied in the start-up meeting.
7.334 Course: Public Management [T-WIWI-102740]

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

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

**Part of:**
- M-WIWI-101504 - Collective Decision Making
- M-WIWI-101511 - Advanced Topics in Public Finance

<table>
<thead>
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<th>Type</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Written exam</td>
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<td>Each winter term</td>
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**Events**

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<tr>
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<th>Recurrence</th>
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<td>WS 20/21</td>
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<td>Public Management</td>
<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Wigger</td>
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</table>

**Competence Certificate**
The assessment consists of a 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

**Prerequisites**
None

**Recommendation**
Basic knowledge of Public Finance is required.

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

**Lecture / Practice (VÜ)**

**Public Management**

- 2561127, WS 20/21, 3 SWS, Language: German, Open in study portal

**Organizational issues**
Dienstag 14:00-15:30 Uhr per Zoom-Livestream

**Literature**

7.335 Course: Public Media Law [T-INFO-101311]

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

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101217 - Public Business Law

<table>
<thead>
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<th>Type</th>
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<tr>
<td>Written examination</td>
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**Events**

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<tr>
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<tr>
<td>WS 20/21</td>
<td>24082</td>
<td>Public Media Law</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Eichenhofer</td>
</tr>
</tbody>
</table>
7.336 Course: Public Revenues [T-WIWI-102739]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101511 - Advanced Topics in Public Finance

Type: Written examination
Credits: 4.5
Recurrence: Each summer term
Version: 1

Events

<table>
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<tr>
<th>SS 2020</th>
<th>2560120</th>
<th>Public Revenues</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Wigger</th>
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<tbody>
<tr>
<td>SS 2020</td>
<td>2560121</td>
<td>Übung zu Öffentliche Einnahmen</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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</tr>
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</table>

Competence Certificate
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

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

Public Revenues
2560120, SS 2020, 2 SWS, Language: German, Open in study portal

Content
The Public Revenues lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

Learning goals:
See German version.

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

Literature

Course: Python Algorithm for Vehicle Technology [T-MACH-110796]

Responsible: Stephan Rhode
Organisation:
Part of: M-MACH-101265 - Vehicle Development
            M-MACH-101266 - Automotive Engineering

Type: Written examination
Credits: 4
Recurrence: Each summer term
Version: 1

Events
| SS 2020 | 2114862 | Python Algorithms for Automotive Engineering | 2 SWS | Lecture (V) | Rhode |

Competence Certificate
Written Examination
Duration: 90 minutes

Prerequisites
none

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

Python Algorithms for Automotive Engineering
2114862, SS 2020, 2 SWS, Language: German, Open in study portal

Content

Teaching content:
- Introduction to Python and useful tools and libraries for creating algorithms, graphical representation, optimization, symbolic arithmetic and machine learning
  - Anaconda, PyCharm, Jupyter
  - NumPy, Matplotlib, SymPy, Scikit-Learn
- Methods and tools for creating software
  - Version management GitHub, git
  - Testing software pytest, Pylint
  - Documentation Sphinx
  - Continuous Integration (CI) Travis CI
  - Workflows in Open Source and Inner Source, Kanban, Scrum
- Practical programming projects to:
  - Road sign recognition
  - Vehicle state estimation
  - Calibration of vehicle models by mathematical optimization
  - Data-based modelling of the powertrain of an electric vehicle

Objectives:
The students have an overview of the programming language Python and important Python libraries to solve automotive engineering problems with computer programs. The students know current tools around Python to create algorithms, to apply them and to interpret and visualize their results. Furthermore, the students know basics in the creation of software to be used in later programming projects in order to develop high-quality software solutions in teamwork. Through practical programming projects (road sign recognition, vehicle state estimation, calibration, data-based modelling), the students can perform future complex tasks from the area of driver assistance systems.
Organizational issues
Campus Ost, Geb. 70.04, Raum 219
Termine siehe Institutshomepage
Bitte bringen Sie Ihren Laptop mit zu den Vorlesungen!
Please bring your laptop to the lecture!

Literature
7.338 Course: Python for Computational Risk and Asset Management [T-WIWI-110213]

Responsible: Prof. Dr. Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105032 - Data Science for Finance

<table>
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Events

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<tr>
<td>WS 20/21</td>
<td>Lecture (V)</td>
<td>2 SWS</td>
<td>Ulrich</td>
<td></td>
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</tbody>
</table>

Competence Certificate

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

Prerequisites
None.

Recommendation
Good knowledge of statistics and basic programming skills

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

Content
The course covers several Python topics, among them:

- Automatic finance data extraction from the web
- Analyzing finance data
- Pattern recognition across asset markets
- Quant portfolio strategies to exploit patterns
- Modeling return densities using time-series and option methods
- Comparing strength and weakness of machine learning tools such as neural networks to financial econometric- and option-implied methods
### Course: Quality Management [T-MACH-102107]

**Responsible:** Prof. Dr.-Ing. Gisela Lanza  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:**  
- M-MACH-101284 - Specialization in Production Engineering  
- M-MACH-105455 - Strategic Design of Modern Production Systems

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#### Events

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<td>WS 20/21</td>
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<td>Quality Management</td>
<td>Lecture (V)</td>
<td>2 SWS</td>
<td>Lanza</td>
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</table>

**Competence Certificate**  
Written Exam (60 min)

**Prerequisites**  
none

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

### Quality Management

2149667, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)  
Lecture (V)
Content
Based on the quality philosophies Total Quality Management (TQM) and Six-Sigma, the lecture will specifically address the needs of a modern quality management. The process orientation in a modern company and the process-specific fields of quality assurance are presented in detail. Preventive as well as non-preventive quality management methods, which are state of the art in operational practice today, are content of the lecture. The use of suitable measurement techniques in production engineering (production measurement technology) as well as their potential levels of integration in the production system are discussed. The use of suitable statistical methods for data analysis and their modern extension by methods of artificial intelligence are be discussed. The contents are complemented by legal aspects in the field of quality management.

Main topics of the lecture:
- The term "Quality"
- Total Quality Management (TQM)
- Six-Sigma and universal methods and tools within the DMAIC cycle
- QM in early product stages – Determination and realization of customer requirements
- QM in product development
- Production measurement technology
- QM in production - statistical methods
- Artificial intelligence and machine learning in quality management
- Operating behaviour and reliability
- Legal aspects in QM

Learning Outcomes:
The students...
- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

Workload:
regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Vorlesungstermine montags 9:45 Uhr
Übung erfolgt während der Vorlesung

Literature
Medien:
Die Vorlesungsschriften inkl. Notizen zur Veranstaltung werden über ILIAS (https://ilias.studium.kit.edu/) bereitgestellt:

Media:
Lecture slides and notes will be provided in ILIAS (https://ilias.studium.kit.edu/).

**Responsible:** Patrick Plötz  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101451 - Energy Economics and Energy Markets

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<th>Type</th>
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<th>Recurrence</th>
<th>Version</th>
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<tbody>
<tr>
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<td>Each winter term</td>
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**Events**

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<tr>
<td>WS 20/21</td>
<td>2581007</td>
<td>Quantitative Methods in Energy Economics</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Plötz, Dengiz, Yilmaz</td>
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<tr>
<td>WS 20/21</td>
<td>2581008</td>
<td>Übung zu Quantitative Methods in Energy Economics</td>
<td>1</td>
<td>Practice (Ü)</td>
<td>Dengiz, Yilmaz, Fichtner</td>
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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 related to this course:

### Quantitative Methods in Energy Economics

2581007, WS 20/21, 2 SWS, Language: English, Open in study portal

#### Content

Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

**Learning Goals:**

The student

- knows and understands selected quantitative methods of energy economics
- is able to use selected quantitative methods of energy economics
- understands they range of usage, limits and is autonomously able to address new problems by them.

**Literature**

Wird in der Vorlesung bekannt gegeben.
Course: Quantum Functional Devices and Semiconductor Technology [T-ETIT-100740]

**Responsible:** Prof. Dr.-Ing. Christian Koos

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

**Part of:**
- M-MACH-101294 - Nanotechnology
- M-MACH-101295 - Optoelectronics and Optical Communication

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<tbody>
<tr>
<td>Oral examination</td>
<td>3</td>
<td>Each summer term</td>
<td>1</td>
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</table>

**Prerequisites**

none
T.342 Course: Rail System Technology [T-MACH-102143]

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

**Part of:** M-MACH-101274 - Rail System Technology

<table>
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<td>SS 2020</td>
<td>Oral examination</td>
<td>9</td>
<td>Each term</td>
<td>3</td>
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</table>

**Competence Certificate**
- Oral examination
- Duration: ca. 45 minutes
- No tools or reference materials may be used during the exam.

**Prerequisites**
- none

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

**Rail System Technology**
2115919, SS 2020, 2 SWS, Language: German, Open in study portal

**Content**
1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, power networks, filling stations
8. History (optional)

**Organizational issues**
Die Vorlesung "Bahnsystemtechnik" im SS 2020 findet bis auf weiteres als asynchrone Online-Veranstaltung statt.

**Literature**
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.
A bibliography is available for download (Ilias-platform).

**Rail Vehicle Technology**
2115996, SS 2020, 2 SWS, Language: German, Open in study portal
Content
1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, interfaces
3. Bogies: forces, running gears, axle configuration
4. Drives: vehicle with/without contact wire, dual-mode vehicle
5. Brakes: tasks, basics, principles, blending, brake control
6. Train control management system: definitions, networks, bus systems, components, examples
7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck coaches, locomotives, freight wagons

Organizational issues
Die Vorlesung "Schienenfahrzeugtechnik" im SS 2020 findet bis auf weiteres als asynchrone Online-Veranstaltung statt.

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.
A bibliography is available for download (Ilias-platform).

Rail System Technology
2115919, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, power networks, filling stations

Organizational issues
Beginn: 20.10.2020

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.
A bibliography is available for download (Ilias-platform).

Rail Vehicle Technology
2115996, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
1. Vehicle system technology: structure and main systems of rail vehicles
2. Car body: functions, requirements, design principles, crash elements, interfaces
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7. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck coaches, locomotives, freight wagons

Organizational issues
Beginn: 20.10.2020

Literature
Eine Literaturliste steht den Studierenden auf der Ilias-Plattform zum Download zur Verfügung.
A bibliography is available for download (Ilias-platform).
7.343 Course: Real World Lab: Innovation Communication [T-WIWI-110920]

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

Type
Examination of another type

Credits
1.5

Recurrence
Once

Version
1

Competence Certificate
Alternative exam assessment (two team presentations).

Annotation
Please note that only one of the courses from the election block can be chosen in the module. Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS points in the respective module to all students. Participation in a specific course cannot be guaranteed. In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.
7.344 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

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**Events**

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<th>2540506</th>
<th>Recommender Systems 2 SWS</th>
<th>Lecture (V)</th>
<th>Geyer-Schulz</th>
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<tr>
<td>SS 2020</td>
<td>2540507</td>
<td>Exercise Recommender Systems 1 SWS</td>
<td>Practice (Ü)</td>
<td>Nazemi</td>
</tr>
</tbody>
</table>

**Competence Certificate**

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**

None

**Recommendation**

None

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

**Recommender Systems**  
2540506, SS 2020, 2 SWS, Language: German, [Open in study portal](#)  
**Lecture (V)**
Content
At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

Learning objectives:
The student
- is proficient in different statistical, data-mining, and game theory methods of computing implicit and explicit recommendations
- evaluates recommender systems and compares these with related services

Workload:
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance
- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Exam:
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from exercises work will be added.

Grade: Minimum points
- 1.0: 95
- 1.3: 90
- 1.7: 85
- 2.0: 80
- 2.3: 75
- 2.7: 70
- 3.0: 65
- 3.3: 60
- 3.7: 55
- 4.0: 50
- 5.0: 0
Literature
Weiterführende Literatur:
### 7.345 Course: Regulation Theory and Practice [T-WIWI-102712]

<table>
<thead>
<tr>
<th>Competence Certificate</th>
<th>The lecture is not offered for an indefinite period of time. Result of success is made by a 20-30 minutes oral examination. Examination is offered every semester and can be retried at any regular examination date.</th>
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<tbody>
<tr>
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<tr>
<td>Recommendation</td>
<td>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.</td>
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<td>Annotation</td>
<td>The lecture is not offered for an indefinite period of time.</td>
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</table>
7.346 Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

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

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

**Part of:**  
M-WIWI-101412 - Industrial Production III  
M-WIWI-101471 - Industrial Production II

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**Events**

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<tr>
<td>WS 20/21</td>
<td>2581992</td>
<td>Risk Management in Industrial Supply Networks</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Wiens</td>
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<td>WS 20/21</td>
<td>2581993</td>
<td>Übung zu Risk Management in Industrial Supply Networks</td>
<td>1</td>
<td>Practice (Ü)</td>
<td>Klein, Wiens</td>
</tr>
</tbody>
</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. Reexaminations are offered at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

None

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

**Risk Management in Industrial Supply Networks**  
2581992, WS 20/21, 2 SWS, Language: English, Open in study portal

**Lecture (V)**

**Content**

Students learn methods and tools to manage risks in complex and dynamically evolving supply chain networks. Students learn the key terms and concepts of risk management and decision theory, in particular expected utility theory. Based on the theoretic prerequisites, students are able to determine and analyze risk diversification, risk pooling, insurance mechanisms and get an overview on statistical risk measures and real options. These approaches are adapted to analyze supply chain risks in a network context. In this manner, students gain knowledge in basic notions of network theory, network metrics and network-strategies for supply chain decisions.

- Introduction
- Risks in decisions under uncertainty: Expected Utility Theory & risk preferences
- The newsvendor model; multivariate risks and insurance
- Risk measures & evaluation techniques: Value-at-Risk, Conditional Value at Risk, Monte Carlo and Real Options
- Transparency in complex supply chains
- Network risk: network basics and criticality
- Risk in supply networks: empirical approaches and insights

**Literature**

Wird in der Veranstaltung bekannt gegeben.
7.347 Course: Roadmapping [T-WIWI-102853]

**Responsible:** Dr. Daniel Jeffrey Koch

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

**Part of:**
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovation Management
- M-WIWI-101507 - Innovation Management

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**Events**

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<td>SS 2020</td>
<td>2545102</td>
<td>Technology Assessment</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
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</table>

**Competence Certificate**


**Prerequisites**

None

**Recommendation**

Prior attendance of the course Innovation Management is recommended.

**Annotation**

See German version.

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

**Technology Assessment**

2545102, SS 2020, 2 SWS, Language: German, [Open in study portal]

**Content**

Technology Assessment can play a role at different points in the innovation process and can be considered as decision support for or against certain technological options. The seminar Technology Assessment will focus on the early phase “fuzzy front end” in innovation management. The technology assessment will take place here under a high degree of uncertainty regarding future technological developments. The evaluation of technologies can be done with methods such as Technology Readiness, Technology Lifecycle Analysis, Portfolio Analysis, etc. The early evaluation of technologies is particularly important against the background of limited resources in companies and uncertainty about future developments.
7.348 Course: Safety Engineering [T-MACH-105171]

**Responsible:** Hans-Peter Kany  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101278 - Material Flow in Networked Logistic Systems  
M-MACH-104888 - Advanced Module Logistics

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**Events**

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<td>2117061</td>
<td>Safety Engineering</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 related to this course:

**Safety Engineering**

2117061, WS 20/21, 2 SWS, Language: German, [Open in study portal]

**Content**

**Media**
Presentations

**Learning content**
The course provides basic knowledge of safety engineering. In particular the basics of health at the working place, job safety in Germany, national and European safety rules and the basics of safe machine design are covered. The implementation of these aspects will be illustrated by examples of material handling and storage technology. This course focuses on: basics of safety at work, safety regulations, basic safety principles of machine design, protection devices, system security with risk analysis, electronics in safety engineering, safety engineering for storage and material handling technique, electrical dangers and ergonomics. So, mainly, the technical measures of risk reduction in specific technical circumstances are covered.

**Learning goals**
The students are able to:

- Name and describe relevant safety concepts of safety engineering,
- Discuss basics of health at work and labour protection in Germany,
- Evaluate the basics for the safe methods of design of machinery with the national and European safety regulations and
- Realize these objectives by using examples in the field of storage and material handling systems.

**Recommendations**
None

**Workload**
Regular attendance: 21 hours  
Self-study: 99 hours

**Note**
Dates: See IFL-Homepage

**Organizational issues**
Termine: siehe IFL-Homepage

Literature
Defren/Wickert: Sicherheit für den Maschinen- und Anlagenbau, Druckerei und Verlag: H. von Ameln, Ratingen
Course: Safety Management in Highway Engineering [T-BGU-101674]

** Responsible:** Dr.-Ing. Matthias Zimmermann

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

** Part of:** M-BGU-101066 - Safety, Computing and Law in Highway Engineering

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** Events**

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<td>Sicherheitsmanagement im Straßenwesen</td>
<td>2 SWS</td>
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<td>Zimmermann</td>
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</table>

** Competence Certificate**
oral exam with 15 minutes

** Prerequisites**
None

** Recommendation**
None

** Annotation**
None
7.350 Course: Selected Applications of Technical Logistics [T-MACH-102160]

**Responsible:** Viktor Milushev
Dr.-Ing. Martin Mittwollen

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-104888 - Advanced Module Logistics

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**Events**

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<td></td>
<td>Mittwollen, Milushev</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

**Recommendation**

Knowledge out of Basics of Technical Logistics I (T-MACH-109919) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned.

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

**Selected Applications of Technical Logistics**

2118087, SS 2020, 3 SWS, Language: German, Open in study portal

**Lecture (V)**

**Content**

- design and dimension of machines from intralogistics
- static and dynamic behaviour
- operation properties and specifics
- Inside practical lectures: sample applications and calculations in addition to the lectures

**Details according schedule will be published**

**Organizational issues**

Die Erfolgskontrolle erfolgt in Form einer mündlichen (20min.) Prüfung (nach §4 (2), 2 SPO). Die Prüfung wird in jedem Semester angeboten und kann zu jedem ordentlichen Prüfungstermin wiederholt werden.

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.

Es werden inhaltliche Kenntnisse aus der Veranstaltung „Grundlagen der Technischen Logistik-I“ (LV 2117095) vorausgesetzt

Knowledge out of Basics of Technical Logistics-I preconditioned

**Literature**

Empfehlungen in der Vorlesung
7.351 Course: Selected Applications of Technical Logistics - Project [T-MACH-108945]

**Responsible:** Viktor Milushev  
Dr.-Ing. Martin Mittwollen

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-104888 - Advanced Module Logistics

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**Events**

| SS 2020 | 2118088 | Selected Applications of Technical Logistics - Project | 1 SWS | Project (PRO) | Milushev, Mittwollen |

**Competence Certificate**
presentation of performed project and defense (30min) according to $4$ (2), No. 3 of the examination regulation

**Prerequisites**
T-MACH-102160 (selected applications of technical logistics) must have been started

**Recommendation**
Knowledge out of Basics of Technical Logistics I (T-MACH-109919) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned.

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

**Selected Applications of Technical Logistics - Project**

2118088, SS 2020, 1 SWS, Language: German, Open in study portal

**Organizational issues**
Ort und Zeit: siehe Homepage / Bekanntgabe in der Veranstaltung

**Literature**
Empfehlungen in der Vorlesung
### 7.352 Course: Selected Issues in Critical Information Infrastructures [T-WIWI-109251]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatics  
- M-WIWI-101628 - Emphasis in Informatics  
- M-WIWI-101630 - Electives in Informatics

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**Events**

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<td>2512403</td>
<td>Praktikum Blockchain und Distributed Ledger Technology (Master)</td>
<td>SWS</td>
<td>Practical course (P)</td>
<td>Sunyaev, Beyene, Kannengießer, Pandl</td>
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<td>WS 20/21</td>
<td>2512403</td>
<td>Practical Course Blockchain Hackathon (Master)</td>
<td>SWS</td>
<td>Practical course (P)</td>
<td>Sunyaev, Kannengießer</td>
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**Competence Certificate**
Alternative exam assessment (§ 4(2), 3 SPO). Details will be announced in the respective course.

**Prerequisites**
None.

**Annotation**
T-WIWI-109251 “Selected Issues in Critical Information Infrastructures” serves to credit an extracurricular course in the module "Critical Digital Infrastructures".
7.353 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 - Intellectual Property Law

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**Events**

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<tr>
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<th>24821</th>
<th>Selected legal issues of Internet law</th>
<th>2 SWS</th>
<th>Colloquium (KOL)</th>
<th>Dreier</th>
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</table>
### 7.354 Course: Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

**Responsible:** Dr. Mathias Heckele  
Dr.-Ing. Timo Mappes  

**Organisation:** KIT Department of Mechanical Engineering  

**Part of:**  
- M-MACH-101287 - Microsystem Technology  
- M-MACH-101290 - BioMEMS  
- M-MACH-101292 - Microoptics  

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<td>Each term</td>
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**Competence Certificate**  
Oral examination  

**Prerequisites**  
none
7.355 Course: Semantic Web Technologies [T-WIWI-110848]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatics
M-WIWI-101628 - Emphasis in Informatics
M-WIWI-101630 - Electives in Informatics

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<td>SS 2020 2511311</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. 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, of the examination regulation.

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

Prerequisites
None

Recommendation
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required.

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

Semantic Web Technologies
2511310, SS 2020, 2 SWS, Language: English, Open in study portal

Lecture (V)
Content
The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals.

Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

The following topics are covered:
- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:
The student
- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Workload:
- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 60 hours
- Exam and exam preparation: 30 hours

Literature

Weitere Literatur

Exercises to Semantic Web Technologies
2511311, SS 2020, 1 SWS, Language: English, Open in study portal
Content
The exercises are related to the lecture Semantic Web Technologies.

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

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Learning objectives:
The student

- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

Recommendations:
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required. Knowledge of modeling with UML is required.

Literature


Weitere Literatur

**Course: Seminar Data-Mining in Production [T-MACH-108737]**

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-WIWI-101808 - Seminar Module

**Type**
Examination of another type

**Credits**
3

**Recurrence**
Each term

**Version**
1

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### 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).

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

**Seminar Data Mining in Production**
2151643, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

### Content
In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

### Learning Outcomes:
The students ...

- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

### Workload:
regular attendance: 10 hours
self-study: 80 hours
Organizational issues
The number of students is limited to twelve. Dates and deadlines for the seminar will be announced at https://www.wbk.kit.edu/studium-und-lehre.php.

Literature
Medien:
KNIME Analytics Platform

Media:
KNIME Analytics Platform

Seminar Data Mining in Production
2151643, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
In the age of Industry 4.0, large amounts of production data are generated by the global production networks and value chains. Their analysis enables valuable conclusions about production and lead to an increasing process efficiency. The aim of the seminar is to get to know production data analysis as an important component of future industrial projects. The students get to know the data mining tool KNIME and use it for analyses. A specific industrial use case with real production data enables practical work and offers direct references to industrial applications. The participants learn selected methods of data mining and apply them to the production data. The work within the seminar takes place in small groups on the computer. Subsequently, presentations on specific data mining methods have to be prepared.

Learning Outcomes:
The students...
- can name, describe and distinguish between different methods, procedures and techniques of production data analysis.
- can perform basic data analyses with the data mining tool KNIME.
- can analyze and evaluate the results of data analyses in the production environment.
- are able to derive suitable recommendations for action.
- are able to explain and apply the CRISP-DM model.

Workload:
regular attendance: 10 hours
self-study: 80 hours

Organizational issues
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.
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<td>SS 2020 2545002</td>
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</table>

**Competence Certificate**

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**

None.

**Recommendation**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

*Below you will find excerpts from events related to this course:*
Interactive Analytics Seminar

2400121, SS 2020, 2 SWS, Language: English, Open in study portal

Content
Providing new and innovative ways for interacting with data is becoming increasingly important. In this seminar, an interdisciplinary team of students engineers a running software prototype of an advanced interactive system leveraging state-of-the-art hardware and software focusing on an analytical use case. The seminar is carried out in cooperation between Teco/Chair of Pervasive Computing Systems (Prof. Beigl) and the Institute of Information Systems and Marketing (Research Group ISSD, Prof. Mädche). This seminar follows an interdisciplinary approach. Students the fields of computer science, information systems and industrial engineering work together in teams.

Learning Objectives
- Explore and specify a data-driven interaction challenge
- Suggest and evaluate different design solutions for addressing the identified problem
- Build interactive analytics prototypes using advanced interaction concepts and pervasive computing technologies

Prerequisites
Strong analytic abilities and profound skills in SQL as well as Python and/or R are required.

Literature
Further literature will be made available in the seminar.

Organizational issues
nach Vereinbarung

Seminar Human Resource Management (Master)

2500006, SS 2020, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student
- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.

Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

Seminar Human Resources and Organizations (Master)

2500007, SS 2020, 2 SWS, Language: German, Open in study portal
Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student

- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.
Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

Advances in Financial Machine Learning
2530372, SS 2020, 2 SWS, Language: English, Open in study portal

Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues
Blücherstr. 17, E009; 14-tägig, tba

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

Seminar in Finance
2530580, SS 2020, 2 SWS, Language: German, Open in study portal

Organizational issues
Termine
1. Termin laut Ankündigung des Lehrstuhls
02.07. von 8 bis 19 Uhr
03.07. von 8 bis 19 Uhr
Alle Termine finden in Geb. 09.21 statt.

Literature
Wird jeweils am Ende des vorherigen Semesters bekanntgegeben.
Content

Learning Objectives

1. Gain practical experience in translating a business problem into a data modeling problem
2. Apply solid theoretical foundations from lectures to real-world data
3. Acquire hands-on experience with industrial data science tools
4. Learn how to communicate data science findings to business stakeholders

Course Credits

The practical seminar can be credited as Seminar Betriebswirtschaftslehre A [WIWI-103474] (3 ECTS). Other courses can be credited upon request.

Seminar Description

The Internet of Things is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, internet access, and economical sensors – physical products turn into cyber-physical smart products that create vast amounts of data.

Current airplanes for example have around 6,000 sensors, creating around 1 TB of data per flight. This data is about the size of all tweets in 3 months worldwide. And this number is growing tremendously. But only 3% of potentially useful data is tagged today, end even less is analyzed. Although Internet of Things use cases such as predictive maintenance are projected to help companies save $630 billion by 2025 (McKinsey, 2015), companies struggle to turn sensor data into actionable insights. To solve this challenge, substantive expertise needs to be combined with skills from software engineering and statistics and machine learning to generate valuable insights from machine data.

The practical seminar is held in cooperation with industry partners of the KSRI, which provide some real-word datasets. Students will then work in teams of three in a close and agile collaboration with the industry subject matter experts from around the world, making use of to the CRISP DM methodology (Chapman et al. 2000)

There will be four different topics and datasets, each assigned to a team of three students. The assignment will be done in the kickoff in calendar week 18. The exact date of the kickoff event will be determined when the participating students have been selected. Attendance at the kickoff event in calendar week 18 is mandatory and a prerequisite for participation.

Expertise in Python and Data Science / Machine Learning is strongly recommended.

Contact

Dominik Martin – dominik.martin@kit.edu
Dr. Niklas Kühl – niklas.kuehl@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.
In this seminar, a team of students addresses a real-world design challenge of an IISM cooperation partner. Students learn and apply design methods, techniques, and tools to explore the problem and deliver a solution in the form of an innovative prototype.

**Learning objectives**

The students

- explore a real-world digital service design challenge
- understand the human-centered design process and apply selected design techniques & tools
- deliver a digital service prototype as a potential solution for the challenge

**Prerequisites**

No specific prerequisites are required for the seminar.

**Literature**

Further literature will be made available in the seminar.

**Organizational issues**

Termine werden bekannt gegeben

### Entrepreneurship Research

**2545002, SS 2020, 2 SWS, Language: German, [Open in study portal](#)**

**Organizational issues**

1. Termin: Do, 23.04.2020, 09:00 - 13:00 Uhr
2. Termin: Mi, 15.07.2020, 09:00 - 16:00 Uhr

Beide Termine finden in Geb. 01.85, Raum 511 statt

**Literature**

Wird im Seminar bekannt gegeben.

### Hospital Management

**2550493, SS 2020, 2 SWS, Language: German, [Open in study portal](#)**

**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. The assessment consists of attendance and a presentation or a case study.

### Open Science and Reproducibility Journal Club (Reproducibilitea)

**2572177, SS 2020, SWS, Language: English, [Open in study portal](#)**
Content
Goal
The goal of the class is to discuss the topics of Open Science and Reproducibility in the Social Sciences. Students will develop an understanding of the challenges that the field has been facing since the start of the Reproducibility Crisis and possible solutions to the problem will be evaluated and discussed in class.

Description
Starting in around 2011, the Social Sciences have entered a so-called Reproducibility Crisis as many findings made in previous studies showed to be difficult or impossible to replicate, a problem casting doubt on the validity of research findings in the field. In class, we will discuss the proposed causes of the crisis – ranging from bad incentive structures in the publication process over statistical malpractice to upright fraud – and their possible solutions. The class will help students to develop an understanding of current debates and challenges from a meta-science perspective.

The class will be held in English.

Grading
There will be weekly homework assignment based on the articles discussed. Additionally, students are required to hold a short presentation, in which they summarize the key message of an article. The scientific literature will be provided to the students.

The homework and presentation will be given in English.

Workload
The total workload for this course is estimated to be 90 hours (30 hours per ECTS / 2 SWS). The class will meet once peer week (Thursday morning 10-12) over the semester to discuss an article on the topic. The homework (including the reading and course preparation) is estimated to take 3h-5h each week.

Comment
This course is based on the Reproducibilitea initiative at the University of Oxford. See here for more information: https://reproducibilitea.org
Seminar in Management Accounting - Special Topics
2579919, SS 2020, 2 SWS, Language: English, Open in study portal

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:
- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources).

Workload:
- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:
- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:
- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Note:
- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

Seminar Human Resource Management (Master)
2500006, WS 20/21, 2 SWS, Language: German, Open in study portal
Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student
- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.
Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

Digital Citizen Science
2500019, WS 20/21, 2 SWS, Language: German/English, Open in study portal
Content
Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Scheibehenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

**Advances in Financial Machine Learning**
2530372, WS 20/21, 2 SWS, Language: English, [Open in study portal]

Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues
Blücherstr. 17, E009; 14-tägig, tba

Literatur
Literatur wird in der ersten Vorlesung bekannt gegeben.

**Data Science in Service Management**
2540473, WS 20/21, 2 SWS, Language: German/English, [Open in study portal]

Content
wird auf deutsch und englisch gehalten

Organizational issues
Blockveranstaltung, siehe WWW

**Master Seminar in Data Science and Machine Learning**
2540510, WS 20/21, 2 SWS, Language: German, [Open in study portal]

**Digital Service Design Seminar**
2540559, WS 20/21, 3 SWS, [Open in study portal]

**Methoden im Innovationsmanagement**
2545107, WS 20/21, 2 SWS, Language: German, [Open in study portal]

Content
The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

Literatur
Werden in der ersten Veranstaltung bekannt gegeben.

Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020
Seminar Management Accounting - Special Topics
2579919, WS 20/21, 2 SWS, Language: English, Open in study portal

Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:
- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources).

Examination:
- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:
- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:
- The total workload for this course is approximately 90 hours. For further information see German version.

Note:
- Maximum of 16 students.

Literature
Will be announced in the course.
### 7 COURSES

Course: Seminar in Business Administration B (Master) [T-WIWI-103476]

**Responsible:** Professorenschaft des Fachbereichs Betriebswirtschaftslehre  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminar Module

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<td>SS 2020 2572177</td>
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<td>SWS</td>
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<td>2 SWS</td>
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**Competence Certificate**

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**

None.

**Recommendation**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

*Below you will find excerpts from events related to this course:*
Seminar Human Resource Management (Master)
2500006, SS 2020, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student
- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.
Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

Seminar Human Resources and Organizations (Master)
2500007, SS 2020, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student
- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.
Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Geb. 05.20, Raum 2A-12.1, Termine werden bekannt gegeben

Advances in Financial Machine Learning
2530372, SS 2020, 2 SWS, Language: English, Open in study portal
Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues
Blücherstr. 17, E009; 14-tägig, tba

Literature
Literatur wird in der ersten Vorlesung bekannt gegeben.

V Seminar in Finance
2530580, SS 2020, 2 SWS, Language: German, Open in study portal

Organizational issues
Termine
1. Termin laut Ankündigung des Lehrstuhls
02.07. von 8 bis 19 Uhr
03.07. von 8 bis 19 Uhr
Alle Termine finden in Geb. 09.21 statt.

Literature
Wird jeweils am Ende des vorherigen Semesters bekanntgegeben.

V Data Science for the Industrial Internet of Things
2540493, SS 2020, SWS, Language: English, Open in study portal
Content

Learning Objectives

1. Gain practical experience in translating a business problem into a data modeling problem
2. Apply solid theoretical foundations from lectures to real-world data
3. Acquire hands-on experience with industrial data science tools
4. Learn how to communicate data science findings to business stakeholders

Course Credits

The practical seminar can be credited as Seminar Betriebswirtschaftslehre A [WIWI-103474] (3 ECTS). Other courses can be credited upon request.

Seminar Description

The Internet of Things is significantly transforming industries such as automotive, healthcare, and energy. With the rise of ubiquitous computing power, internet access, and economical sensors – physical products turn into cyber-physical smart products that create vast amounts of data.

Current airplanes for example have around 6,000 sensors, creating around 1 TB of data per flight. This data is about the size of all tweets in 3 months worldwide. And this number is growing tremendously. But only 3% of potentially useful data is tagged today, end even less is analyzed. Although Internet of Things use cases such as predictive maintenance are projected to help companies save $630 billion by 2025 (McKinsey, 2015), companies struggle to turn sensor data into actionable insights. To solve this challenge, substantive expertise needs to be combined with skills from software engineering and statistics and machine learning to generate valuable insights from machine data.

The practical seminar is held in cooperation with industry partners of the KSRI, which provide some real-word datasets. Students will then work in teams of three in a close and agile collaboration with the industry subject matter experts from around the world, making use of to the CRISP DM methodology (Chapman et al. 2000)

There will be four different topics and datasets, each assigned to a team of three students. The assignment will be done in the kickoff in calendar week 18. The exact date of the kickoff event will be determined when the participating students have been selected. Attendance at the kickoff event in calendar week 18 is mandatory and a prerequisite for participation.

Expertise in Python and Data Science / Machine Learning is strongly recommended.

Contact

Dominik Martin – dominik.martin@kit.edu
Dr. Niklas Kühl – niklas.kuehl@kit.edu

The practical seminar will be held in English. Application documents can be handed in in English or German.

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Masterseminar in Data Science and Machine Learning
2540510, SS 2020, 2 SWS, Language: German/English, Open in study portal

Digital Service Design Seminar
2540559, SS 2020, 3 SWS, Language: English, Open in study portal

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Content

Description

In this seminar, a team of students addresses a real-world design challenge of an IISM cooperation partner. Students learn and apply design methods, techniques, and tools to explore the problem and deliver a solution in the form of an innovative prototype

Learning objectives

The students

- explore a real-world digital service design challenge
- understand the human-centered design process and apply selected design techniques & tools
- deliver a digital service prototype as a potential solution for the challenge

Prerequisites

No specific prerequisites are required for the seminar

Literature

Further literature will be made available in the seminar.
Organizational issues
Termine werden bekannt gegeben

**Entrepreneurship Research**
2545002, SS 2020, 2 SWS, Language: German, [Open in study portal]

**Organizational issues**
1. Termin: Do, 23.04.2020, 09:00 - 13:00 Uhr
2. Termin: Mi, 15.07.2020, 09:00 - 16:00 Uhr
Beide Termine finden in Geb. 01.85, Raum 511 statt

**Literature**
Wird im Seminar bekannt gegeben.

**Hospital Management**
2550493, SS 2020, 2 SWS, Language: German, [Open in study portal]

**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.
The assessment consists of attendance and a presentation or a case study.

**Open Science and Reproducibility Journal Club (Reproducibilitea)**
2572177, SS 2020, SWS, Language: English, [Open in study portal]

**Content**

**Goal**
The goal of the class is to discuss the topics of Open Science and Reproducibility in the Social Sciences. Students will develop an understanding of the challenges that the field has been facing since the start of the Reproducibility Crisis and possible solutions to the problem will be evaluated and discussed in class.

**Description**
Starting in around 2011, the Social Sciences have entered a so-called Reproducibility Crisis as many findings made in previous studies showed to be difficult or impossible to replicate, a problem casting doubt on the validity of research findings in the field. In class, we will discuss the proposed causes of the crisis – ranging from bad incentive structures in the publication process over statistical malpractice to upright fraud – and their possible solutions. The class will help students to develop an understanding of current debates and challenges from a meta-science perspective.
The class will be held in English.

**Grading**
There will be weekly homework assignment based on the articles discussed. Additionally, students are required to hold a short presentation, in which they summarize the key message of an article. The scientific literature will be provided to the students.
The homework and presentation will be given in English.

**Workload**
The total workload for this course is estimated to be 90 hours (30 hours per ECTS / 2 SWS). The class will meet once per week (Thursday morning 10-12) over the semester to discuss an article on the topic. The homework (including the reading and course preparation) is estimated to take 3h-5h each week.

**Comment**
This course is based on the Reproducibilitea initiative at the University of Oxford. See here for more information: [https://reproducibilitea.org](https://reproducibilitea.org)

**Seminar Management Accounting**
2579909, SS 2020, 2 SWS, Language: English, [Open in study portal]
Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Learning objectives:
- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources).

Workload:
- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:
- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:
- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Note:
- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.
Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:

- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources).

Workload:

- The total workload for this course is approximately 90 hours. For further information see German version.

Examination:

- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:

- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Note:

- Maximum of 16 students.

Organizational issues
Geb.05.20, 2A-12.1; Termine werden bekannt gegeben

Literature
Will be announced in the course.

Seminar Human Resource Management (Master)
2500006, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student

- looks critically into current research topics in the fields of Human Resource Management and Personnel Economics.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.
Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.
Seminar Human Resources and Organizations (Master)
2500007, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Wiwi-Portal.

Aim
The student
- looks critically into current research topics in the fields of human resources and organizations.
- trains his / her presentation skills.
- learns to get his / her ideas and insights across in a focused and concise way, both in oral and written form, and to sum up the crucial facts.
- cultivates the discussion of research approaches.

Workload
The total workload for this course is: approximately 90 hours.
Lecture: 30h
Preparation of lecture: 45h
Exam preparation: 15h

Literature
Selected journal articles and books.

Organizational issues
Blockveranstaltung siehe Homepage

Digital Citizen Science
2500019, WS 20/21, 2 SWS, Language: German/English, Open in study portal

Content
Digital Citizen Science is an innovative approach to conduct field research - interactively and in the real world. Especially in times of social distancing measures essential questions about how private lives are changing are investigated. Who is experiencing more stress during HomeOffice hours? Who is flourishing while learning at home because flow is experienced more often? Which formats of digital cooperation are fostering social contacts and bonding? These and other questions that target the main topic: Well-being @Home are focused in these seminar projects.

The seminar theses are supervised by academics from multiple institutes that are working together on the topic of Digital Citizen Science arbeiten. Involved are the research groups of Prof. Mädche, Prof. Nieken, Prof. Schelbhenne, Prof. Szech, Prof. Volkamer, Prof. Weinhardt and Prof. Woll.

Advances in Financial Machine Learning
2530372, WS 20/21, 2 SWS, Language: English, Open in study portal

Content
Machine learning (ML) is changing virtually every aspect of our lives. Today ML algorithms accomplish tasks that until recently only expert humans could perform. As it relates to finance, this is the most exciting time to adopt a disruptive technology that will transform how everyone invests for generations.

In this seminar we will apply modern machine learning techniques hands on to important computational risk and asset management problems. In particular we will use the state of the art Python programming language to implement investment related applications and/ or Finance 4.0 risk management solutions.

In a bi-weekly schedule you and your supervisor will first learn and discuss important machine learning concepts and then apply it within a practical FinTech project to real-world data. As a prerequisite students should already have some basic Python and data science skills.

Organizational issues
Blücherstr. 17, E009; 14-tägig, tba

Literature
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<td>WS 20/21</td>
<td>2</td>
<td>German/English</td>
<td>[Open in study portal]</td>
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<td>Master Seminar in Data Science and Machine Learning</td>
<td>2540510</td>
<td>WS 20/21</td>
<td>2</td>
<td>German</td>
<td>[Open in study portal]</td>
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<td>Digital Service Design Seminar</td>
<td>2540559</td>
<td>WS 20/21</td>
<td>3</td>
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<td>[Open in study portal]</td>
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<td>Methoden im Innovationsmanagement</td>
<td>2545107</td>
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<td>2</td>
<td>German</td>
<td>[Open in study portal]</td>
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<td>2579919</td>
<td>WS 20/21</td>
<td>2</td>
<td>English</td>
<td>[Open in study portal]</td>
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**Content**

The seminar "Methods in Innovation Management" aims at the discussion and development of different methods for the structured generation of ideas in selected contexts. In a block seminar, methods and contexts are discussed, from which seminar topics are defined with the participants. These topics are to be worked on independently using methods and procedures. The results will be presented at a presentation date and then a written seminar paper will be prepared. This means that creativity methods and their combination will be presented and applied. The methods are worked on in a structured form and process-like sequence in order to clarify the advantages and disadvantages of different methods.

**Literature**

Werden in der ersten Veranstaltung bekannt gegeben.
Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in several meetings that are spread throughout the semester.

Learning objectives:
- Students are largely independently able to identify a distinct topic in Management Accounting,
- Students are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- Students can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources).

Examination:
- The performance review is carried out in the form of a "Prüfungsleistung anderer Art" (following § 4 (2) No. 3 of the examination regulation), which in this case is an essay the seminar participants prepare in group work.
- The final grade of the course is the grade awarded to the paper.

Required prior Courses:
- The LV "Betriebswirtschaftslehre: Finanzwirtschaft und Rechnungswesen" (2600026) must have been completed before starting this seminar.

Workload:
- The total workload for this course is approximately 90 hours. For further information see German version.

Note:
- Maximum of 16 students.

Literature
Will be announced in the course.
T 7.359 Course: Seminar in Economic Policy [T-WIWI-102789]

**Responsible:** Prof. Dr. Ingrid Ott  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101514 - Innovation Economics

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<td>Each term</td>
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</table>

**Competence Certificate**
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted scored examinations (Essay 50%, 40% oral presentation, active participation 10%).

**Prerequisites**
None

**Recommendation**
At least one of the lectures “Theory of Endogenous Growth” or "Innovation Theory and Policy" should be attended in advance, if possible.
### 7.360 Course: Seminar in Economics A (Master) [T-WIWI-103478]

**Responsible:** Professorenschaft des Fachbereichs Volkswirtschaftslehre  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminar Module

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#### Events

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<td>SS 2020</td>
<td>2521310</td>
<td>Advanced Topics in Econometrics</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Schienle, Krüger, Buse, Görgen</td>
</tr>
<tr>
<td>SS 2020</td>
<td>2560282</td>
<td>Wirtschaftspolitisches Seminar</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Ott, Assistenten</td>
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<tr>
<td>SS 2020</td>
<td>2560555</td>
<td>Fighting Climate Change, Seminar on Morals and Social Behavior (Master)</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Szech, Zhao</td>
</tr>
<tr>
<td>SS 2020</td>
<td>2560557</td>
<td>Designing the Digital Economy, Topics on Political Economy (Master)</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Szech, Huber</td>
</tr>
<tr>
<td>WS 20/21</td>
<td>2560140</td>
<td>Topics in Political Economy (Bachelor)</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Szech, Huber</td>
</tr>
<tr>
<td>WS 20/21</td>
<td>2560142</td>
<td>Topics in Political Economy (Master)</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Szech, Huber</td>
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<tr>
<td>WS 20/21</td>
<td>2560143</td>
<td>Morals &amp; Social Behavior (Master)</td>
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<tr>
<td>WS 20/21</td>
<td>2561208</td>
<td>Ausgewählte Aspekte der europäischen Verkehrsplanung und -modellierung</td>
<td>1</td>
<td>Seminar (S)</td>
<td>Szimba</td>
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</table>

#### Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

#### Prerequisites

None.

#### Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

#### Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

#### Advanced Topics in Econometrics

2521310, SS 2020, 2 SWS, Language: English, [Open in study portal](https://campus.kit.edu)
Organizational issues
Blockveranstaltung. Termine werden bekannt gegeben

**Fighting Climate Change, Seminar on Morals and Social Behavior (Master)**
2560555, SS 2020, 2 SWS, Language: English, [Open in study portal]

**Content**
For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see [http://polit.econ.kit.edu](http://polit.econ.kit.edu) or [https://portal.wiwi.kit.edu/Seminare](https://portal.wiwi.kit.edu/Seminare)

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

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Organizational issues
Blockveranstaltung

**Designing the Digital Economy, Topics on Political Economy (Master)**
2560557, SS 2020, 2 SWS, Language: English, [Open in study portal]

**Content**
For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see [http://polit.econ.kit.edu](http://polit.econ.kit.edu) or [https://portal.wiwi.kit.edu/Seminare](https://portal.wiwi.kit.edu/Seminare)

Seminar Papers of 8–10 pages are to be handed in.

For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%). Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

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**Topics in Political Economy (Bachelor)**
2560140, WS 20/21, 2 SWS, Language: English, [Open in study portal]

**Content**
For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see [http://polit.econ.kit.edu](http://polit.econ.kit.edu) or [https://portal.wiwi.kit.edu/Seminare](https://portal.wiwi.kit.edu/Seminare)

Seminar Papers of 8–10 pages are to be handed in.

For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade. Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.
### Course: Seminar in Economics B (Master) [T-WIWI-103477]

**Responsible:** Professorenschaft des Fachbereichs Volkswirtschaftslehre  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminar Module  
**Type:** Examination of another type  
**Credits:** 3  
**Recurrence:** Each term  
**Version:** 1

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<td>Schienle, Krüger, Buse, Görgen</td>
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### Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

### Prerequisites

None.

### Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

### Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

#### Advanced Topics in Econometrics

2521310, SS 2020, 2 SWS, Language: English, Open in study portal

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Industrial Engineering and Management M.Sc.  
Module Handbook as of 14/09/2020
Organizational issues
Blockveranstaltung. Termine werden bekannt gegeben

- **Fighting Climate Change, Seminar on Morals and Social Behavior (Master)**
  - 2560555, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
  - Seminar (S)

  **Content**
  For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

  **Objective:** The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see [http://polit.econ.kit.edu](http://polit.econ.kit.edu) or [https://portal.wiwi.kit.edu/Seminare](https://portal.wiwi.kit.edu/Seminare)

  The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

  Seminar Papers of 8–10 pages are to be handed in.

  Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

- **Designing the Digital Economy, Topics on Political Economy (Master)**
  - 2560555, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
  - Seminar (S)

- **Topics in Political Economy (Bachelor)**
  - 2560140, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)
  - Seminar (S)

  **Content**
  For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

  **Objective:** The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see [http://polit.econ.kit.edu](http://polit.econ.kit.edu) or [https://portal.wiwi.kit.edu/Seminare](https://portal.wiwi.kit.edu/Seminare)

  Seminar Papers of 8–10 pages are to be handed in.

  For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%). Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

  Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

- **Topics in Political Economy (Master)**
  - 2560142, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)
  - Seminar (S)

  **Content**
  For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

  **Objective:** The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see [http://polit.econ.kit.edu](http://polit.econ.kit.edu) or [https://portal.wiwi.kit.edu/Seminare](https://portal.wiwi.kit.edu/Seminare)

  Seminar Papers of 8–10 pages are to be handed in.

  For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade. Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

  Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.
7.362 Course: Seminar in Engineering Science Master (approval) [T-WIWI-108763]

**Responsible:** Fachvertreter ingenieurwissenschaftlicher Fakultäten

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

**Part of:** M-WIWI-101808 - Seminar Module

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**Events**

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<td>2119100</td>
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<td>Seminar (S)</td>
<td>Furmans, Pagani</td>
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</tbody>
</table>

**Competence Certificate**
See German version.

**Prerequisites**
See module description.

**Recommendation**
None

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

**Fördertechnik und Logistiksysteme**
2119100, SS 2020, SWS, Open in study portal

**Content**
The goal of the seminar is to deal with different topics related to the materials handling and logistics. The students can work on the topic either alone or in a group work. At the end the results are presented and discussed with a final presentation. The prepare the work for the seminar an introductory event is scheduled at the beginning.

**Organizational issues**
Ort: Gebäude 50.38, Raum 0.22, Termine siehe homepage
7.363 Course: Seminar in Informatics A (Master) [T-WIWI-103479]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

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<tr>
<td>SS 2020</td>
<td>Seminar Knowledge Discovery and Data Mining (Master)</td>
<td>2 SWS</td>
<td>Seminar ($)</td>
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<tr>
<td>SS 2020</td>
<td>Seminar Data Science &amp; Real-time Big Data Analytics (Master)</td>
<td>2 SWS</td>
<td>Seminar ($)</td>
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<tr>
<td>SS 2020</td>
<td>Emerging Trends in Internet Technologies (Master)</td>
<td>2 SWS</td>
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<td>SS 2020</td>
<td>Emerging Trends in Digital Health (Master)</td>
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<td>SS 2020</td>
<td>Cognitive Automobiles and Robots</td>
<td>2 SWS</td>
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<td>SS 2020</td>
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<td>SS 2020</td>
<td>Seminar Security, Usability and Society (Master)</td>
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<td>SS 2020</td>
<td>Seminar Service Science, Management &amp; Engineering</td>
<td>2 SWS</td>
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<tr>
<td>WS 20/21</td>
<td>Security and Privacy Awareness</td>
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<td>WS 20/21</td>
<td>Seminar Linked Data and the Semantic Web (Bachelor)</td>
<td>2 SWS</td>
<td>Seminar ($)</td>
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<td>WS 20/21</td>
<td>Seminar Linked Data and the Semantic Web (Master)</td>
<td>2 SWS</td>
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<td>WS 20/21</td>
<td>Seminar Cognitive Automobiles and Robots (Master)</td>
<td>2 SWS</td>
<td>Seminar ($)</td>
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<tr>
<td>WS 20/21</td>
<td>Seminar Representation Learning for Knowledge Graphs (Master)</td>
<td>2 SWS</td>
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Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.
Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.
Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

Seminar Knowledge Discovery and Data Mining (Master)
2513309, SS 2020, 3 SWS, Language: English, Open in study portal

Content
In this seminar different machine learning and data mining methods are implemented.
The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

The exact dates and information for registration will be announced at the event page.

Organizational issues
Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu./
Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

Literature
Detaillierte Referenzen werden zusammen mit den jeweiligen Themen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B. aus den folgenden Lehrbüchern:

- Mitchell, T.; Machine Learning

Seminar Data Science & Real-time Big Data Analytics (Master)
2513311, SS 2020, 2 SWS, Language: English, Open in study portal

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.
Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.
Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de
Questions are answered via the e-mail address sem-ep@fzi.de.
Cognitive Automobiles and Robots
Course: Seminar in Informatics A (Master) [T-WIWI-103479]
Module Handbook as of 14/09/2020

Organizational issues
Further information as well as the registration form can be found under the following link:
http://seminar-cep.fzi.de
Questions are answered via the e-mail address sem-ep@fzi.de.

Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:
- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:
Attendance of the lecture machine learning

Workload:
The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im Wiwi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.
Content
Seminar:
The main topic of this seminar is security, usability, and society. The goal is to analyze these topics from different perspectives. Always important is the human, as we are interested in how humans interact with certain problems and how it might be possible to tackle it. For instance, phishing detection, how is it possible to ensure a higher detection. To tackle this problem, you can either focus on the technical side, awareness training, regulations by organizations.

Further important information:
Because of the current situation, every meeting will be held online. This might change during the semester, depending on the course of the corona situation.

Important dates:
- Kick-Off 22.04
- Final submission 01.07
- Presentation 14.07

Topics:
- Do the SECUSO password awareness and education materials reflect the new "BSI Grundschutz"
- Systematic literature on security interventions in the context of phishing
- Key factors in "good" phishing emails
- Systematic literature review categorization of phishing paper

Further descriptions of the topics will be announced asap.

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php.

Seminar Service Science, Management & Engineering
2595470, SS 2020, 2 SWS, Language: German, Open in study portal

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Learning objectives:
The student
- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Recommendations:
Lecture eServices [2595466] is recommended.

Workload:
The total workload for this course is approximately 90 hours.

Organizational issues
siehe Ankündigung des Instituts

Literature
Die Basisliteratur wird entsprechend der zu bearbeitenden Themen bereitgestellt.

Security and Privacy Awareness
2400125, WS 20/21, 2 SWS, Open in study portal
Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Dates:
- Kick-Off: TBA
- Final version: TBA
- Presentation: TBA

Topics will be assigned after the Kick-Off.

Topics: TBA

ATTENTION: The seminar is only for MASTER students!

Seminar Data Science & Real-time Big Data Analytics (Master)
2513311, WS 20/21, 2 SWS, Language: German/English, Open in study portal

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

Organizational issues
Further information as well as the registration form can be found under the following link:
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Seminar Linked Data and the Semantic Web (Bachelor)
2513312, WS 20/21, 2 SWS, Language: German/English, Open in study portal
Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

Seminar Linked Data and the Semantic Web (Master)

2513313, WS 20/21, 2 SWS, Language: German/English, [Open in study portal](#)

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

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Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

Seminar Cognitive Automobiles and Robots (Master)

2513500, WS 20/21, 2 SWS, Language: German/English, [Open in study portal](#)
Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML. The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

Learning objectives:

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

Recommendations:
Attendance of the lecture machine learning

Workload:
The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im WiWi-Portal zu finden.
Registration and further information can be found in the WiWi-portal.

Seminar Representation Learning for Knowledge Graphs (Master)
2513601, WS 20/21, 2 SWS, Language: English, Open in study portal

Content
Participation is restricted to 10 students max.

Contributions of the students:
Each student will be assigned at max 2 papers on the topic. Out of which the student will have to give a seminar presentation and write a seminar report paper of 15 pages explaining the methods from at least one of the two assigned papers, in their own words.

Implementation (if applicable):
If code is available from the authors, then re-implementation of it for small scale experiments using Google Colab with python.

Teaching Team:
- Dr. Mehwish Alam
- Dr. Danilo Dessi
- M. Sc. Russa Biswas

Data representation or feature representation plays a key role in the performance of machine learning algorithms. In recent years, rapid growth has been observed in Representation Learning (RL) of words and Knowledge Graphs (KG) into low dimensional vector spaces and its applications to many real-world scenarios. Word embeddings are a low dimensional vector representation of words that are capable of capturing the context of a word in a document, semantic similarity as well as its relation with other words. Similarly, KG embeddings are a low dimensional vector representation of entities and relations from a KG preserving its inherent structure and capturing the semantic similarity between the entities. Each embedding space exhibits different semantic characteristics based on the source of information, e.g. text or KGs as well as the learning of the embedding algorithms. The same algorithm, when applied to different representations of the same training data, leads to different results due to the variation in the features encoded in the respective representations. The distributed representation of text in the form of the word and document vectors as well as of the entities and relations of the KG in form of entity and relation vectors have evolved as the key elements of various natural language processing tasks such as Entity Linking, Named Entity Recognition and disambiguation, etc. Different embedding spaces are generated for textual documents of different languages, hence aligning the embedding spaces has become a stepping stone for machine translation. On the other hand, in addition to multilingualism and domain-specific information, different KGs of the same domain have structural differences, making the alignment of the KG embeddings more challenging. In order to generate coherent embedding spaces for knowledge-driven applications such as question answering, named entity disambiguation, knowledge graph completion, etc., it is necessary to align the embedding spaces generated from different sources.

In this seminar, we would like to study the different state of the art algorithms for aligning embedding space. We would focus on two types of alignment algorithms: (1) Entity - Entity alignment, and (2) Entity - Word alignment.

Organizational issues
Registration and further information can be found in the WiWi-portal.
### 7.364 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

**Responsible:** Professorenschaft des Fachbereichs Informatik  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101808 - Seminar Module

<table>
<thead>
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<td>Security and Privacy Awareness</td>
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<td>Seminar Representation Learning for Knowledge Graphs (Master)</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
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**Competence Certificate**  
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.
Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

### Seminar Knowledge Discovery and Data Mining (Master)

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</table>

Content
In this seminar different machine learning and data mining methods are implemented.
The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.
Domains of interest include, but are not limited to:
- Medicine
- Social Media
- Finance Market

The exact dates and information for registration will be announced at the event page.

Organizational issues
Die Anmeldung erfolgt über das WiWi Portal https://portal.wiwi.kit.edu/.
Für weitere Fragen bezüglich des Seminar und der behandelten Themen wenden Sie sich bitte an die entsprechenden Verantwortlichen.

Literature
Detaillierte Referenzen werden zusammen mit den jeweiligen Themen angegeben. Allgemeine Hintergrundinformationen ergeben sich z.B. aus den folgenden Lehrbüchern:
- Mitchell, T.: Machine Learning

### Seminar Data Science & Real-time Big Data Analytics (Master)

<table>
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<th>Language</th>
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<td>2</td>
<td>English</td>
<td>Open in study portal</td>
</tr>
</tbody>
</table>

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.
Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.
Further information to the practical seminar is given under the following Link: http://seminar-cep.fzi.de
Questions are answered via the e-mail address sem-ep@fzi.de.
**Organizational issues**

Further information as well as the registration form can be found under the following link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.

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**Cognitive Automobiles and Robots**

2513500, SS 2020, 2 SWS, Language: German/English, [Open in study portal](#)

**Content**

The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

**Learning objectives:**

- Students can apply knowledge from the Machine Learning lecture in a selected field of current research in robotics or cognitive automobiles for theoretical analysis.
- Students can evaluate, document and present their concepts and results.

**Recommendations:**

Attendance of the lecture machine learning

**Workload:**

The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

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**Organizational issues**

Anmeldung und weitere Informationen sind im WiWi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

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**Seminar E-Voting (Master)**

2513553, SS 2020, 2 SWS, Language: German/English, [Open in study portal](#)

**Content**

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website [https://secuso.aifb.kit.edu/Studium_und_Lehre.php](https://secuso.aifb.kit.edu/Studium_und_Lehre.php).

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**Seminar Security, Usability and Society (Master)**

2513555, SS 2020, 2 SWS, Language: German, [Open in study portal](#)
Content
Seminar:
The main topic of this seminar is security, usability, and society. The goal is to analyze these topics from different perspectives. Always important is the human, as we are interested in how humans interact with certain problems and how it might be possible to tackle it. For instance, phishing detection, how is it possible to ensure a higher detection. To tackle this problem, you can either focus on the technical side, awareness training, regulations by organizations.

Further important information:
Because of the current situation, every meeting will be held online. This might change during the semester, depending on the course of the corona situation.

Important dates:
- Kick-Off 22.04
- Final submission 01.07
- Presentation 14.07

Topics:
- Do the SECUSO password awareness and education materials reflect the new "BSI Grundschutz"
- Systematic literature review categorization of phishing paper
- Key factors in “good” phishing emails
- Systematic literature on security interventions in the context of phishing

Further descriptions of the topics will be announced asap.

This course can also be credited for the KASTEL certificate. Further information about obtaining the certificate can be found on the SECUSO website https://secuso.aifb.kit.edu/Studium_und_Lehre.php.

Seminar Service Science, Management & Engineering
2595470, SS 2020, 2 SWS, Language: German, [Open in study portal]

Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Learning objectives:
The student
- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Recommendations:
Lecture eServices [2595466] is recommended.

Workload:
The total workload for this course is approximately 90 hours.

Organizational issues
siehe Ankündigung des Instituts

Literature
Die Basisliteratur wird entsprechend der zu bearbeitenden Themen bereitgestellt.
Content
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Dates:
- Kick-Off: TBA
- Final version: TBA
- Presentation: TBA

Topics will be assigned after the Kick-Off.
Topics:
TBA

ATTENTION: The seminar is only for MASTER students!

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**Seminar Data Science & Real-time Big Data Analytics (Master)**
2513311, WS 20/21, 2 SWS, Language: German/English, Open in study portal

Content
In this seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

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For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

The exact dates and information for registration will be announced at the event page.

Seminar Linked Data and the Semantic Web (Master)
2513313, WS 20/21, 2 SWS, Language: German/English, Open in study portal

Content

Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

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Seminar Cognitive Automobiles and Robots (Master)
2513500, WS 20/21, 2 SWS, Language: German/English, Open in study portal
Content
The seminar is intended as a theoretical supplement to lectures such as "Machine Learning". The theoretical basics will be deepened in the seminar. The aim of the seminar is that the participants work individually to analyze a subsystem from the field of robotics and cognitive systems using one or more procedures from the field of AI/ML.

The individual projects require the analysis of the task at hand, selection of suitable procedures, specification and theoretical evaluation of the approach taken. Finally, the chosen solution has to be documented and presented in a short presentation.

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- Students can evaluate, document and present their concepts and results.

Recommendations:
Attendance of the lecture machine learning

Workload:
The workload of 3 credit points consists of the time spent on literature research and planning/specifying the proposed solution. In addition, a short report and a presentation of the work carried out will be prepared.

Organizational issues
Anmeldung und weitere Informationen sind im WiWi-Portal zu finden.

Registration and further information can be found in the WiWi-portal.

Seminar Representation Learning for Knowledge Graphs (Master) 2513601, WS 20/21, 2 SWS, Language: English, Open in study portal

Content
Participation is restricted to 10 students max.

Contributions of the students:
Each student will be assigned at max 2 papers on the topic. Out of which the student will have to give a seminar presentation and write a seminar report paper of 15 pages explaining the methods from at least one of the two assigned papers, in their own words.

Implementation (if applicable):
If code is available from the authors, then re-implementation of it for small scale experiments using Google Colab with python.

Teaching Team:
- Dr. Mehwish Alam
- Dr. Danilo Dessi
- M. Sc. Russa Biswas

Data representation or feature representation plays a key role in the performance of machine learning algorithms. In recent years, rapid growth has been observed in Representation Learning (RL) of words and Knowledge Graphs (KG) into low dimensional vector spaces and its applications to many real-world scenarios. Word embeddings are a low dimensional vector representation of words that are capable of capturing the context of a word in a document, semantic similarity as well as its relation with other words. Similarly, KG embeddings are a low dimensional vector representation of entities and relations from a KG preserving its inherent structure and capturing the semantic similarity between the entities. Each embedding space exhibits different semantic characteristics based on the source of information, e.g. text or KGs as well as the learning of the embedding algorithms. The same algorithm, when applied to different representations of the same training data, leads to different results due to the variation in the features encoded in the respective representations. The distributed representation of text in the form of the word and document vectors as well as of the entities and relations of the KG in form of entity and relation vectors have evolved as the key elements of various natural language processing tasks such as Entity Linking, Named Entity Recognition and disambiguation, etc. Different embedding spaces are generated for textual documents of different languages, hence aligning the embedding spaces has become a stepping stone for machine translation. On the other hand, in addition to multilingualism and domain-specific information, different KGs of the same domain have structural differences, making the alignment of the KG embeddings more challenging. In order to generate coherent embedding spaces for knowledge-driven applications such as question answering, named entity disambiguation, knowledge graph completion, etc., it is necessary to align the embedding spaces generated from different sources.

In this seminar, we would like to study the different state of the art algorithms for aligning embedding space. We would focus on two types of alignment algorithms: (1) Entity - Entity alignment, and (2) Entity - Word alignment.

Organizational issues
Registration and further information can be found in the WiWi-portal.
Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

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

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101808 - Seminar Module

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Events

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Competence Certificate

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites

None.

Recommendation

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

Seminar: Modern OR and Innovative Logistics
2550491, SS 2020, 2 SWS, Language: German, Open in study portal
Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:
The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).

The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.

The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:
If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Organizational issues
wird auf der Homepage dol.ior.kit.edu bzw. auf dem WiWi-Portal bekannt gegeben

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

Seminar: Modern OR and Innovative Logistics
2550491, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization. The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
wird auf der Homepage bekannt gegeben

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.
Course: Seminar in Operations Research B (Master) [T-WIWI-103482]

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

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

**Part of:**
M-WIWI-101808 - Seminar Module

**Type**
Examination of another type

**Credits**
3

**Recurrence**
Each term

**Version**
1

### Events

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**Competence Certificate**

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**

None.

**Recommendation**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore, for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

*Below you will find excerpts from events related to this course:*
Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization.
The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Attendance is compulsory for the preliminary meeting as well for all seminar presentations.

Exam:
The assessment consists of a written seminar thesis of 20-25 pages and a presentation of 35-40 minutes (according to §4(2), 3 of the examination regulation).
The final mark for the seminar consists of the seminar thesis, the seminar presentation, the handout, and if applicable further material such as programming code.
The seminar can be attended both by Bachelor and Master students. A differentiation will be achieved by different valuation standards for the seminar thesis and presentation.

Requirements:
If possible, at least one module of the institute should be taken before attending the seminar.

Objectives:
The student

- illustrates and evaluates classic and current research questions in discrete optimization,
- applies optimization models and algorithms in discrete optimization, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management),
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Organizational issues
wird auf der Homepage dol.ior.kit.edu bzw. auf dem WiWi-Portal bekannt gegeben

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.

Seminar: Modern OR and Innovative Logistics
2550491, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
The seminar aims at the presentation, critical evaluation and exemplary discussion of recent questions in discrete optimization.
The focus lies on optimization models and algorithms, also with regard to their applicability in practical cases (especially in Supply Chain and Health Care Management). The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic. Regarding the seminar presentations, the students will be familiarized with basic presentational and rhetoric skills.

Organizational issues
wird auf der Homepage bekannt gegeben

Literature
Die Literatur und die relevanten Quellen werden zu Beginn des Seminars bekannt gegeben.
## 7.367 Course: Seminar in Statistics A (Master) [T-WIWI-103483]

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

### Organisation:
KIT Department of Economics and Management

### Part of:
M-WIWI-101808 - Seminar Module

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### Events

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<th>Advanced Topics in Econometrics</th>
<th>2 SWS</th>
<th>Seminar (S)</th>
<th>Schienle, Krüger, Buse, Görgen</th>
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### Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

### Prerequisites
None.

### Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

### Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

### Advanced Topics in Econometrics
2521310, SS 2020, 2 SWS, Language: English, [Open in study portal](https://portal.wiwi.kit.edu)

### Organizational issues
Blockveranstaltung. Termine werden bekannt gegeben
7.368 Course: Seminar in Statistics B (Master) [T-WIWI-103484]

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

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

**Part of:** M-WIWI-101808 - Seminar Module

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**Events**

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**Competence Certificate**

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**

None.

**Recommendation**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

**Advanced Topics in Econometrics**  
2521310, SS 2020, 2 SWS, Language: English, Open in study portal

**Organizational issues**

Blockveranstaltung. Termine werden bekannt gegeben
Course: Seminar in Transportation [T-BGU-100014]

Responsible: Bastian Chlond  
Prof. Dr.-Ing. Peter Vortisch

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

Part of:  
M-BGU-101064 - Fundamentals of Transportation  
M-BGU-101065 - Transportation Modelling and Traffic Management  
M-WIWI-101808 - Seminar Module

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Events

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Competence Certificate

seminar paper, appr. 10 pages, and presentation, appr. 10 min.

Prerequisites

The seminar is subject to approval. The approval must be applied for at the examination secretariat of the Department of Economics and Management. The application for admission is made via the corresponding engineering seminar form on the department's download page.

Recommendation

none

Annotation

none
Course: Seminar Methods along the Innovation process [T-WIWI-110987]

**Responsible:** Dr. Daniela Beyer

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

**Part of:** M-WIWI-101507 - Innovation Management

**Type:** Examination of another type

**Credits:** 3

**Recurrence:** Irregular

**Version:** 1

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</table>

**Competence Certificate**
Alternative exam assessment.

**Recommendation**
Prior attendance of the course Innovation Management [2545015] is recommended.
7.371 Course: Seminar Mobility Services (Master) [T-WIWI-103174]

**Responsible:** Prof. Dr. Gerhard Satzger  
Carola Stryja

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

**Part of:**  
M-BGU-101064 - Fundamentals of Transportation  
M-BGU-101065 - Transportation Modelling and Traffic Management

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**Competence Certificate**  
A final written exam will be conducted.

**Prerequisites**  
None

**Annotation**  
The course is not offered regularly.
7.372 Course: Seminar Production Technology [T-MACH-109062]

**Responsible:** Prof. Dr.-Ing. Jürgen Fleischer
Prof. Dr.-Ing. Gisela Lanza
Prof. Dr.-Ing. Volker Schulze

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-WIWI-101808 - Seminar Module

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**Type**
Examination of another type

**Credits**
3

**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 related to this course:

**Seminar Production Technology**
2149665, SS 2020, 1 SWS, Language: German, Open in study portal

**Content**
In course of the seminar Production Technology current issues of the wbk main fields of research "Manufacturing and Materials Technology", "Machines, Equipment and Process Automation" as well as "Production Systems" are discussed.

The specific topics are published on the homepage of the wbk Institute of Production Science.

**Learning Outcomes:**
The students ...
- are in a position to independently handle current, research-based tasks according to scientific criteria.
- are able to research, analyze, abstract and critically review the information.
- can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

**Workload:**
regular attendance: 10 hours
self-study: 80 hours

**Organizational issues**
siehe http://www.wbk.kit.edu/seminare.php
7.373 Course: Seminar Sensors [T-ETIT-100707]

**Responsible:** Dr. Wolfgang Menesklou

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

**Part of:** M-ETIT-101158 - Sensor Technology I

### Type
Examination of another type

### Credits
3

### Version
1

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</table>
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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<td>2 SWS</td>
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### 7.375 Course: Seminar: Legal Studies I [T-INFO-101997]

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

**Organisation:** KIT Department of Informatics

**Part of:** M-WIWI-101808 - Seminar Module

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#### Events

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<td>Seminar (S)</td>
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<td>SS 2020</td>
<td>Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung</td>
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<tr>
<td>WS 20/21</td>
<td>Data in Software-Intensive Technical Systems – Modeling – Analysis – Protection</td>
<td>2 SWS</td>
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<td>WS 20/21</td>
<td>Hate speech &amp; Fake news – Das öffentliche Recht in der „postrationalen Konstellation“?</td>
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<td>Seminar (S)</td>
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<td>WS 20/21</td>
<td>Grundfragen Ethik und IT</td>
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<td>WS 20/21</td>
<td>IT-Sicherheit und Recht</td>
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<tr>
<td>WS 20/21</td>
<td>Seminar Information security and data protection (Bachelor)</td>
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</table>

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

#### Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung

**2400061, SS 2020, 2 SWS, Open in study portal**

**Content**

Registration via [https://portal.wiwi.kit.edu/ys/2708](https://portal.wiwi.kit.edu/ys/2708)

**Organizational issues**

nach Vereinbarung

#### Online Manipulative Practices: New Technologies and Fundamental Rights Infringements

**2400153, SS 2020, 2 SWS, Open in study portal**
Content

New science-based technologies are fostering the process of making individuals more amenable to forms of manipulation online. The more technological capabilities improve, the more surveillance expands, the life of individuals becomes transparent, easier to predict and therefore easier to manipulate. More invasive practices lead to infringements of fundamental rights, which are not always easy to detect, as surveillance and manipulation techniques are getting more sophisticated and less obvious. After the now notorious Cambridge Analytica data scandal, we have now hard evidence individuals are exposed to manipulative practices online, which are most of the time difficult to detect as they operate silently and automatically. Manipulative practices aim at covertly subverting another person’s capacity for conscious decision-making by exploiting in particular his/her cognitive, emotional, or other decision-making vulnerabilities. They involve influences that (1) are hidden, (2) exploit vulnerabilities, and (3) are targeted. The seminar has the objective to discuss a series of new technologies and techniques that are and can be used in online manipulative practices and analyse their legal and ethical implications. Special attention is dedicated to the risk such practices pose to fundamental rights such as the right to privacy, the right to the protection of personal data and the right to non-discrimination.

10 sub-topics are provided below. It is a list of new technologies and techniques that can be used in manipulative practices. Students should pick one sub-topic in order to write a short paper and prepare a presentation. Students work is guided through a series of questions and a list of recommended literature. In short, papers and presentations should be generally structured in this way:

- Describe the technology/techniques.
- Describe the legal and ethical implications stemming from the use and application of the selected technology/techniques. What fundamental rights are at stake?
- Focus on one legal aspect, for example the infringement of the right to privacy, (the sub-topic title and description and list of literature already guide the student in this sense), analyse the current legal framework concerning the protection of that right and describe the legal challenges that these new technologies and methods pose.

We also encourage students to investigate possible technical solutions to the problems highlighted in their analysis.

Organizational issues

ACHTUNG: Es handelt sich um ein Seminar für MASTER-Studierende!
7.376 Course: Seminar: Legal Studies II [T-INFO-105945]

**Responsibility:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-WIWI-101808 - Seminar Module

**Type:** Examination of another type  
**Credits:** 3  
**Version:** 1

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

### Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung

**2400061, SS 2020, 2 SWS, Open in study portal**

**Content**

Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

**Dates:**
- Kick-Off: TBA
- Final version: TBA
- Presentation: TBA

Topics will be assigned after the Kick-Off.

**ATTENTION:** The seminar is only for MASTER students!
7.377 Course: Sensors [T-ETIT-101911]

**Responsible:** Dr. Wolfgang Menesklou

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

**Part of:** M-ETIT-101158 - Sensor Technology I

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<td>Each summer term</td>
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</tbody>
</table>
### 7.378 Course: Service Analytics A [T-WIWI-105778]

**Responsible:** Prof. Dr. Hansjörg Fromm  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
M-WIWI-101448 - Service Management  
M-WIWI-101470 - Data Science: Advanced CRM  
M-WIWI-101506 - Service Analytics

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<td>SS 2020</td>
<td>2595501</td>
<td>Service Analytics A</td>
<td>3</td>
<td>Lecture (V)</td>
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</table>

**Competence Certificate**  
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation.

**Prerequisites**  
None

**Recommendation**  
The lecture is addressed to students with interests and basic knowledge in the topics of Operations Research, descriptive and inductive statistics.

**Annotation**  
This course is admission restricted.

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

### V Service Analytics A  
2595501, SS 2020, 3 SWS, Language: English, Open in study portal  
Lecture (V)
Content

Learning objectives
This course teaches students how to apply machine learning concepts to develop predictive models that form the basis of many innovative service offerings and business models today. Using a selected use case each term, students learn the foundations of selected algorithms and development frameworks and apply them to build a functioning prototype of an analytics-based service. Students will become proficient in writing code in Python to implement a data science use case over the course period.

Description
Data-driven services have become a key differentiator for many companies. Their development is based on the increasing availability of structured and unstructured data and their analysis through methods from data science and machine learning. Examples comprise highly innovative service offerings based on technologies such as natural language processing, computer vision or reinforcement learning.

Using a selected use case, this lecture will teach students how to develop analytics-based services in an applied setting. We teach the theoretical foundations of selected machine learning algorithms (e.g., convolutional neural networks) and development concepts (e.g., developing modeling, training, inference pipelines) and teach how to apply these concepts to build a functioning prototype of an analytics-based service (e.g., inference running on a device). During the course, students will work in small groups to apply the learned concepts in the programming language Python using packages such as Keras, Tensorflow or Scikit-Learn.

Recommendations
The course is aimed at students in the Master program with basic knowledge in statistics and applied programming in Python. Familiarity with the contents of the lecture Artificial Intelligence in Service Systems will be beneficial.

Additional information
Due to the practical group sessions in the course, the number of participants is limited. Further information on the application process can be found on the course website (https://dsi.iism.kit.edu/64_411.php).

Please apply via the WiWi Portal until April 17, 2020: https://portal.wiwi.kit.edu/ys/3539

Organizational issues
Blockveranstaltung, Termine werden bekannt gegeben

Literature
Course: Service Design Thinking [T-WIWI-102849]

7.379 Course: Service Design Thinking [T-WIWI-102849]

**Responsible:** Prof. Dr. Gerhard Satzger

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

**Part of:** M-WIWI-101503 - Service Design Thinking

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**Competence Certificate**
Alternative exam assessment.

**Prerequisites**
None

**Recommendation**
This course is held in English – proficiency in writing and communication is required.

Our past students recommend to take this course at the beginning of the masters program.

**Annotation**
Due to practical project work as a component of the program, access is limited.

The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.

For more information on the application process and the program itself are provided in the module component description and the program's website [http://sdt-karlsruhe.de](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](http://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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<td>Service Innovation</td>
<td>Lecture (V)</td>
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</table>

**Competence Certificate**

The assessment consists of a written exam (60 min.). A bonus can be acquired through successful participation in the exercise. If the grade of the written exam is between 4.0 and 1.3, the bonus improves the grade by one grade (0.3 or 0.4). Details will be announced in the lecture.

**Prerequisites**

None

**Recommendation**

None

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

#### Service Innovation

**2595468, SS 2020, 2 SWS, Language: English, Open in study portal**

**Lecture (V)**

**Content**

Continuous innovation is a prerequisite for firms to stay competitive. While innovation in manufacturing or agriculture can build on a considerable body of research, experience and best practices, innovation in services has not reached the same level of maturity.

This course takes a close look at the topic of service innovation. We will lay the foundations with an initial overview of service innovation including the basic concepts, challenges and innovation processes. We will compare product and service innovation and understand how innovation diffusion works.

The second part focuses on applicable methods and tools for service innovation: we will cover possible sources of innovations, ways to identify opportunities for innovations and the potential of service innovations built on data. For example, open and closed innovation approaches will be contrasted, the benefits of leveraging user communities to drive innovation will be explored and the human-centric innovation approach (Service) Design Thinking will be introduced. We will also look into the opportunities that technology offers for service innovation.

The last part of the lecture covers the management of service innovation and insights from practice. You will understand obstacles and enablers, and learn how to manage, incentivize and foster service innovation.
Literature

7.381 Course: SIL Entrepreneurship Emphasis [T-WIWI-110287]

Responsible: Prof. Dr. Orestis Terzidis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-105010 - Student Innovation Lab (SIL) 1

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Competence Certificate
Alternative exam assessment (§4(2), 3 SPO). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar. In addition, smaller, ungraded tasks are provided in the course to monitor progress.

Prerequisites
None

Recommendation
None
7.382 Course: SIL Entrepreneurship Project [T-WIWI-110166]

- **Responsible:** Prof. Dr. Orestis Terzidis
- **Organisation:** KIT Department of Economics and Management
- **Part of:** M-WIWI-105010 - Student Innovation Lab (SIL) 1

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**Competence Certificate**
Alternative exam assessment (§4(2), 3 SPO). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar. In addition, smaller, ungraded tasks are provided in the course to monitor progress.

**Prerequisites**
None

**Recommendation**
None
7.383 Course: Simulation Game in Energy Economics [T-WIWI-108016]

**Responsible:** Dr. Massimo Genoese  
**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101451 - Energy Economics and Energy Markets

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**Events**

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<th>SS 2020</th>
<th>2581025</th>
<th>Simulation Game in Energy Economics</th>
<th>3 SWS</th>
<th>Lecture / Practice (VÜ)</th>
<th>Genoese, Zimmermann</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 related to this course:*

**Simulation Game in Energy Economics**  
2581025, SS 2020, 3 SWS, Language: German, [Open in study portal](#)

**Lecture / Practice (VÜ)**

**Content**

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.

**Assessment:** presentation and written summary

**Prerequisites:** Basics in Energy economics ad markets are advantageous.

**Organizational issues**

CIP-Pool West, Raum 102, Geb. 06.41 - siehe Institutsaushang

**Literature**

Weiterführende Literatur:

7.384 Course: Simulation of Coupled Systems [T-MACH-105172]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Yusheng Xiang

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-101265 - Vehicle Development

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<td>4</td>
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</table>

Events

| SS 2020 | 2114095 | Simulation of Coupled Systems | 2 SWS | Lecture (V) | Geimer, Xiang, Daiß |

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 is mandatory, the details will be announced on the webpages of the Institute of Vehicle System Technology / Institute of Mobile Machines. In case of too many applications, attendance will be granted based on pre-qualification.

Prerequisites

Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108888 must have been passed.

Recommendation

- Knowledge of ProE (ideally in actual version)
- Basic 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 related to this course:

Simulation of Coupled Systems
2114095, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)
Content

- Knowledge of the basics of multi-body and hydraulic simulation programs
- Possibilities of coupled simulations
- Development of a simulation model by using the example of a wheel loader
- Documentation of the result in a short report

It is recommended to have:

- Knowledge of ProE (ideally in current version)
- Basic knowledge of Matlab/Simulink
- Basic knowledge of dynamics of machines
- Basic knowledge of hydraulics

- regular attendance: 21 hours
- total self-study: 92 hours

Literature

Weiterführende Literatur:

- Diverse Handbücher zu den Softwaretools in PDF-Form
- Informationen zum verwendeten Radlader
7.385 Course: Simulation of Coupled Systems - Advance [T-MACH-108888]

**Responsible:** Prof. Dr.-Ing. Marcus Geimer  
Yusheng Xiang

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101265 - Vehicle Development

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**Competence Certificate**
Preparation of semester report

**Prerequisites**
none
### Course: Site Management [T-BGU-103427]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101884 - Lean Management in Construction
- M-BGU-101888 - Project Management in Construction

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#### Events

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<th>Bauleitung</th>
<th>1 SWS</th>
<th>Lecture (V)</th>
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</table>

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
### 7.387 Course: Smart Energy Infrastructure [T-WIWI-107464]

**Responsible:** Dr. Armin Ardone  
Dr. Dr. Andrej Marko Pustisek  

**Organisation:** KIT Department of Economics and Management  

**Part of:** M-WIWI-101452 - Energy Economics and Technology

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<td>(Smart) Energy Infrastructure</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Ardone, Pustisek</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.

**Annotation**

Below you will find excerpts from events related to this course:

#### (Smart) Energy Infrastructure

2581023, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Content**
- Basic terms and concepts
- Meaning of infrastructure
- Excursus: regulation of infrastructure
- Natural gas transportation
- Natural gas storage
- Electricity transmission
- (Overview) Crude oil and oil product transportation
Course: Smart Grid Applications [T-WIWI-107504]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101446 - Market Engineering
M-WIWI-103720 - eEnergy: Markets, Services and Systems

Events

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<td>2 SWS</td>
<td>Lecture (V) Staudt</td>
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<td>WS 20/21</td>
<td>2540453 Übung zu Smart Grid Applications</td>
<td>1 SWS</td>
<td>Lecture (V) Staudt</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.
Course: Social Choice Theory [T-WIWI-102859]

**Responsible:** Prof. Dr. Clemens Puppe

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101500 - Microeconomic Theory
- M-WIWI-101504 - Collective Decision Making

**Type:** Written examination  
**Credits:** 4.5  
**Recurrence:** Each summer term  
**Version:** 1

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<th>2520537</th>
<th>Social Choice Theory</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
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<tr>
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<td>SS 2020</td>
<td>2520539</td>
<td></td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Puppe, Kretz</td>
</tr>
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</table>

**Competence Certificate**  
The assessment consists of a written exam (60 minutes). The exam takes place in every semester.

**Prerequisites**  
None

Below you will find excerpts from events related to this course:

**Social Choice Theory**  
2520537, SS 2020, 2 SWS, Language: English, [Open in study portal]

**Content**  
How should (political) candidates be elected? What are good ways of merging individual judgments into collective judgments? Social Choice Theory is the systematic study and comparison of how groups and societies can come to collective decisions.

The course offers a rigorous and comprehensive treatment of judgment and preference aggregation as well as voting theory. It is divided into two parts. The first part deals with (general binary) aggregation theory and builds towards a general impossibility result that has the famous Arrow theorem as a corollary. The second part treats voting theory. Among other things, it includes proving the Gibbard-Satterthwaite theorem.

**Literature**

Main texts:

Secondary texts:
7.390 Course: Sociotechnical Information Systems Development [T-WIWI-109249]

**Responsible:** Prof. Dr. Ali Sunyaev

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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**Events**

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<td>3 SWS</td>
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<td>Sunyaev, Pandl</td>
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</table>

**Competence Certificate**
The alternative exam assessment consists of an implementation and a final thesis documenting the development and use of the application.

**Prerequisites**
None.

*Below you will find excerpts from events related to this course:*

**Development of Sociotechnical Information Systems (Bachelor)**

2512400, SS 2020, 3 SWS, Language: German/English, [Open in study portal](#)  
Practical course (P)

**Content**
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.

**Development of Sociotechnical Information Systems (Master)**

2512401, SS 2020, 3 SWS, Language: German/English, [Open in study portal](#)  
Practical course (P)

**Content**
The aim of the lab is to get to know the development of socio-technical information systems in different application areas. In the event framework, you should develop a suitable solution strategy for your problem alone or in group work, collect requirements, and implement a software artifact based on it (for example, web platform, mobile apps, desktop application). Another focus of the lab is on the subsequent quality assurance and documentation of the implemented software artifact.

Registration information will be announced on the course page.
Practical Course Sociotechnical Information Systems Development (Bachelor)
2512400, WS 20/21, 3 SWS, Language: German/English, Open in study portal

Content
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Learning objectives:
- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form

Practical Course Sociotechnical Information Systems Development (Master)
2512401, WS 20/21, 3 SWS, Language: German/English, Open in study portal

Content
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Learning objectives:
- Independent and self-organized realization of a software development project
- Evaluation and selection of suitable development tools and methods
- Application of modern software development methods
- Planning and execution of different development tasks: requirements assessment, system design, implementation, and quality assurance
- Project documentation
- Presentation of project results in an comprehensible and structured form
7.391 Course: Software Quality Management [T-WIWI-102895]

**Responsible:** Prof. Dr. Andreas Oberweis

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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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 related to this course:**

**Software Quality Management**

2511208, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Content**

This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

**Learning objectives:**

Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of sofware certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

**Recommendations:**

Programming knowledge in Java and basic knowledge of computer science are expected.

**Workload:**

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h
Literature

- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Weitere Literatur wird in der Vorlesung bekanntgegeben.
7.392 Course: Spatial Economics [T-WIWI-103107]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101485 - Transport Infrastructure Policy and Regional Development
M-WIWI-101496 - Growth and Agglomeration
M-WIWI-101497 - Agglomeration and Innovation

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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.

Below you will find excerpts from events related to this course:

Spatial Economics

2561260, WS 20/21, 2 SWS, Language: English, Open in study portal

Lecture (V)
Content
The course covers the following topics:

- Geography, trade and development
- Geography and economic theory
- Core models of economic geography and empirical evidence
- Agglomeration, home market effect, and spatial wages
- Applications and extensions

Learning objectives:
The student

- analyses how spatial distribution of economic activity is determined.
- uses quantitative methods within the context of economic models.
- has basic knowledge of formal-analytic methods.
- understands the link between economic theory and its empirical applications.
- understands to what extent concentration processes result from agglomeration and dispersion forces.
- is able to determine theory based policy recommendations.

Recommendations:
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. An interest in mathematical modeling is advantageous.

Workload:
The total workload for this course is approximately 135 hours.

- Classes: ca. 30 h
- Self-study: ca. 45 h
- Exam and exam preparation: ca. 60 h

Assessment:
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Literature

Weitere Literatur wird in der Vorlesung bekanntgegeben.
(Further literature will be announced in the lecture.)
Course: Special Topics in Highway Engineering and Environmental Impact Assessment [T-BGU-101860]

**Responsible:** Prof. Dr.-Ing. Ralf Roos

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-100999 - Highway Engineering

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**Competence Certificate**
oral exam with 15 minutes

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
T 7.394 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

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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**
see below

**Recommendation**
None

**Annotation**
All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Systems course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre

The Special Topics Information Systems is equivalent to the practical seminar, as it was only offered for the major in “Information Management and Engineering” so far. With this course students majoring in “Industrial Engineering and Management” and “Economics Engineering” also have the chance of getting practical experience and enhance their scientific capabilities.

The Special Topics Information Systems can be chosen instead of a regular lecture (see module description). Please take into account, that this course can only be accounted once per module.
**7.395 Course: Specialization in Food Process Engineering [T-CIWVT-101875]**

**Responsible:** Dr. Volker Gaukel

**Organisation:** KIT Department of Chemical and Process Engineering

**Part of:** M-CIWVT-101119 - Specialization in Food Process Engineering

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<td>2 SWS</td>
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**Prerequisites**
The Module "Principles of Food Process Engineering" must be passed.
7.396 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

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<th>Responsible:</th>
<th>apl. Prof. Dr. Wolf-Dieter Heller</th>
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| Part of:              | M-WIWI-101638 - Econometrics and Statistics I  
M-WIWI-101639 - Econometrics and Statistics II |

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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.

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Below you will find excerpts from events related to this course:

Content
Learning objectives:
The student has profound knowledge of generalized regression models.

Requirements:
Knowledge of the contents covered by the course Economics III: Introduction in Econometrics" [2520016].

Workload:
Total workload for 4.5 CP: approx. 135 hours
Attendance: 30 hours
Preparation and follow-up: 65 hours
### Course: Stochastic Calculus and Finance [T-WIWI-103129]

**Responsible:** Dr. Mher Safarian  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101639 - Econometrics and Statistics II

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#### Competence Certificate
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.).

#### Prerequisites
None

#### Annotation
For more information see http://statistik.econ.kit.edu/

Below you will find excerpts from events related to this course:

**Stochastic Calculus and Finance**
2521331, WS 20/21, 2 SWS, Language: English, **Open in study portal**

#### Content

**Learning objectives:**
After successful completion of the course students will be familiar with many common methods of pricing and portfolio models in finance. Emphasis we be put on both finance and the theory behind it.

**Content:**
The course will provide rigorous yet focused training in stochastic calculus and mathematical finance. Topics to be covered:


#### Workload:
Total workload for 4.5 CP: approx. 135 hours  
Attendance: 30 hours  
Preparation and follow-up: 65 hours

#### Organizational issues
Blockveranstaltung, Termine werden über Ilias bekannt gegeben
Literature

- Stochastic Finance: An Introduction in Discrete Time by H. Föllmer, A. Schied, de Gruyter, 2011
- Introduction to Stochastic Calculus Applied to Finance by D. Lamberton, B. Lapeyre, Chapman&Hall, 1996
Course: Strategic Finance and Technology Change [T-WWI-110511]

**Responsible:** Prof. Dr. Martin Ruckes

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WWI-101480 - Finance 3
- M-WWI-101483 - Finance 2

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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**
Attending the lecture “Financial Management” is strongly recommended.
# 7.399 Course: Strategic Foresight China [T-WIWI-110986]

**Responsible:** Prof. Dr. Marion Weissenberger-Eibl  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101507 - Innovation Management  
M-WIWI-101507 - Innovation Management

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**Competence Certificate**  
Alternative exam assessment.

**Recommendation**  
Prior attendance of the course Innovation Management [2545015] is recommended.
7.400 Course: Strategic Management of Information Technology [T-WIWI-102669]

**Responsible:** Prof. Dr. Thomas Wolf

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 2

**Competence Certificate**
Please note that the exam for first writers will be offered for the last time in winter semester 2019/2020. A last examination possibility exists in the summer semester 2020 (only for repeaters).

The assessment of this course is a written (60 min.) or (if necessary) oral examination according (30 min.) to §4(2) of the examination regulation.

**Prerequisites**
None
7.401 Course: Strategic Transport Planning [T-BGU-103426]

**Responsible:**  Volker Waßmuth

**Organisation:**  KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**  
- M-BGU-101064 - Fundamentals of Transportation
- M-BGU-101065 - Transportation Modelling and Traffic Management

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**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
7.402 Course: Strategy and Management Theory: Developments and “Classics” [T-WWI-106190]

**Responsible:** Prof. Dr. Hagen Lindstädt

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WWI-103119 - Advanced Topics in Strategy and Management

### Events

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<td>2 SWS</td>
<td>Seminar ($)</td>
<td>Lindstädt</td>
<td></td>
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</table>

### Competence Certificate

The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a conclusion meeting. Details on the design of the performance review will be announced during the lecture.

### Prerequisites

None

### Recommendation

Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

### Annotation

This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

**Strategy and Management Theory: Developments and "Classics" (Master)**

2577921, SS 2020, 2 SWS, Language: German, Open in study portal

Seminar ($)
Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:
Students
- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:
Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

Assessment:
The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a final meeting. Details on the design of the success control will be announced during the lecture.

Note:
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.
The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

Organizational issues
siehe Homepage

Workshop aktuelle Themen Strategie und Management (Master)
2577921, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:
Students
- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:
Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

Assessment:
The control of success according to § 4(2), 3 SPO takes place by writing a scientific work and a presentation of the results of the work in the context of a final meeting. Details on the design of the success control will be announced during the lecture.

Note:
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.
The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.
Organizational issues
siehe Homepage
4 Blöcke mittwochs nachmittags
05.20 Raum 2A-12.1
7.403 Course: Structural and Phase Analysis [T-MACH-102170]

**Responsible:** Dr. Manuel Hinterstein  
Dr.-Ing. Susanne Wagner

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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**Events**

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<td>2125763</td>
<td>Structural and phase analysis</td>
<td>2</td>
<td>Wagner, Hinterstein</td>
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</table>

**Competence Certificate**

Oral examination

**Prerequisites**

none

Below you will find excerpts from events related to this course:

**Structural and phase analysis**

2125763, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Organizational issues**

Die Vorlesung findet im Hörsaal am Fasanengarten (Geb. 50.35, R 101) oder online statt; erster Termin: 03.11.2020

**Literature**

1. Moderne Röntgenbeugung - Röntgendiffraktometrie für Materialwissenschaftler, Physiker und Chemiker, Spieß, Lothar / Schwarzer, Robert / Behnken, Herfried / Teichert, Gerd B.G. Teubner Verlag 2005
7.404 Course: Structural Ceramics [T-MACH-102179]

**Responsible:** Prof. Dr. Michael Hoffmann  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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**Events**

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<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Hoffmann</th>
</tr>
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</table>

**Competence Certificate**

Oral examination, 20 min

**Prerequisites**

none

*Below you will find excerpts from events related to this course:*

**Structural Ceramics**  
2126775, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Literature**


7.405 Course: Superhard Thin Film Materials [T-MACH-102103]

**Responsible:** apl. Prof. Dr. Sven Ulrich

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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<td>Each winter term</td>
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**Events**

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<tr>
<td>WS 20/21</td>
<td>2177618</td>
<td>Superhard Thin Film Materials</td>
<td>2 SWS</td>
</tr>
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</table>

**Competence Certificate**

oral examination (ca. 30 Minuten)

**Prerequisites**

none

Below you will find excerpts from events related to this course:

**Superhard Thin Film Materials**

2177618, WS 20/21, 2 SWS, Language: German, [Open in study portal]

**Content**

oral examination (about 30 min), no tools or reference materials

Teaching Content:

Introduction

Basics

Plasma diagnostics

Particle flux analysis

Sputtering and ion implantation

Computer simulations

Properties of materials, thin film deposition technology, thin film analysis and modelling of superhard materials

Amorphous hydrogenated carbon

Diamond like carbon

Diamond

Cubic Boronnitride

Materials of the system metall-boron-carbon-nitrogen-silicon

regular attendance: 22 hours

self-study: 98 hours

Superhard materials are solids with a hardness higher than 4000 HV 0.05. The main topics of this lecture are modelling, deposition, characterization and application of superhard thin film materials.

Recommendations: none
Literature
G. Kienel (Herausgeber): Vakuumbeschichtung 1 - 5, VDI Verlag, Düsseldorf, 1994

Abbildungen und Tabellen werden verteilt; Copies with figures and tables will be distributed
T 7.406 Course: Supplement Enterprise Information Systems [T-WIWI-110346]

**Responsible:** Prof. Dr. Andreas Oberweis

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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<td>Each term</td>
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**Competence Certificate**
The assessment of this course is a written examination (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

**Prerequisites**
None
### 7.407 Course: Supplement Software- and Systemsengineering [T-WIWI-110372]

**Responsible:** Prof. Dr. Andreas Oberweis  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101472 - Informatics  
- M-WIWI-101628 - Emphasis in Informatics  
- M-WIWI-101630 - Electives in Informatics

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<tr>
<td>Written examination</td>
<td>4.5</td>
<td>Each term</td>
<td>1</td>
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</table>

**Competence Certificate**  
The assessment consists of an 1h written exam in the first week after lecture period.

**Prerequisites**  
None

**Annotation**  
This course can be used in particular for the acceptance of external courses whose content is in the broader area of software and systems engineering, but cannot assigned to another course of this topic.
### 7.408 Course: Supplementary Claim Management [T-BGU-103428]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101888 - Project Management in Construction

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<td>Each summer term</td>
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</table>

- **Events**

| SS 2020 | 6241811 | Nachtragsmanagement | 1 SWS | Lecture (V) | Haghsheno, Pietsch |

- **Prerequisites**

  None

- **Recommendation**

  None

- **Annotation**

  None
### Course: Supply Chain Management in the Automotive Industry [T-WIWI-102828]

**Responsible:** Tilman Heupel  
Hendrik Lang

**Organisation:** KIT Department of Economics and Management

**Part of:**  
M-WIWI-101412 - Industrial Production III  
M-WIWI-101471 - Industrial Production II

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**Events**

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<tr>
<td>WS 20/21</td>
<td>Supply Chain Management in the automotive industry</td>
<td>Lecture (V)</td>
<td>2 SWS</td>
<td>Each winter term</td>
<td>Lang, Heupel</td>
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</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 related to this course:**

**Supply Chain Management in the automotive industry**  
2581957, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**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

**Organizational issues**  
Geb. 50.41 Raum 145/146

**Literature**  
Wird in der Veranstaltung bekannt gegeben.
**7.410 Course: Supply Chain Management with Advanced Planning Systems [T-WIWI-102763]**

**Responsible:** Claus J. Bosch  
Dr. Mathias Göbelt

**Organisation:** KIT Department of Economics and Management

**Part of:**  
M-WIWI-101412 - Industrial Production III  
M-WIWI-101471 - Industrial Production II

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<td>Each summer term</td>
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| Events |           |                |          |          |
|--------|-----------|-----------------|----------|
| SS 2020| 2581961   | Supply Chain Management with Advanced Planning Systems | 2 SWS | Lecture (V) | Göbelt, Bosch |

**Competence Certificate**  
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**  
None

**Recommendation**  
None

Below you will find excerpts from events related to this course:

**Supply Chain Management with Advanced Planning Systems**  
2581961, SS 2020, 2 SWS, Language: English, [Open in study portal](#)  
Lecture (V)
Content
This lecture deals with supply chain management from a practitioner’s perspective with a special emphasis Advanced Planning Systems (APS) and the planning domain. The software solution SAP SCM, one of the most widely used Advanced Planning Systems, is used as an example to show functionality and application of an APS in practice.

First, the term supply chain management is defined and its scope is determined. Methods to analyze supply chains as well as indicators to measure supply chains are derived. Second, the structure of an APS (advanced planning system) is discussed in a generic way. Later in the lecture, the software solution SAP SCM is mapped to this generic structure. The individual planning tasks and software modules (demand planning, supply network planning / sales & operations planning, production planning / detailed scheduling, deployment, transportation planning, global available-to-promise) are presented by discussing the relevant business processes, providing academic background, describing typical planning processes and showing the user interface and user-related processes in the software solution. At the end of the lecture, implementation methodologies and project management approaches for SAP SCM are covered.

Contents
1. Introduction to Supply Chain Management
   1.1. Supply Chain Management Fundamentals
   1.2. Supply Chain Management Analytics
2. Structure of Advanced Planning Systems
3. SAP SCM
   3.1. Introduction / SCM Solution Map
   3.2. Demand Planning
   3.4. Production Planning and Detailed Scheduling
   3.5. Deployment
   3.6. Transportation Planning / Global Available to Promise
   3.7. Cloud-based Supply Chain Planning
4. SAP SCM in Practice
   4.1. Project Management and Implementation
   4.2. SAP Implementation Methodology

Literature
will be announced in the course
7.411 Course: Systematic Materials Selection [T-MACH-100531]

**Responsible:** Dr.-Ing. Stefan Dietrich  
Prof. Dr.-Ing. Volker Schulze  

**Organisation:** KIT Department of Mechanical Engineering  

**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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<td>Systematic Materials Selection</td>
<td>3 SWS</td>
<td>Lecture (V)</td>
<td>Dietrich</td>
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<tr>
<td>SS 2020 2174577</td>
<td>Übungen zu 'Systematische Werkstoffauswahl'</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Dietrich, Mitarbeiter</td>
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**Competence Certificate**
The assessment is carried out as a written exam of 2 h.

**Prerequisites**
None.

**Recommendation**
It is strongly recommended to pass the two courses "Materials Science I" (T-MACH-102078) and "Materials Science II" (T-MACH-102079).

*Below you will find excerpts from events related to this course:*

**Systematic Materials Selection**

2174576, SS 2020, 3 SWS, Language: German, Open in study portal

Lecture (V)
Content
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are 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

learning objectives:
The students are able to select the best material for a given application. They are proficient in selecting materials on base of performance indices and materials selection charts. They can identify conflicting objectives and find sound compromises. They are aware of the potential and the limits of hybrid material concepts (composites, bimaterials, foams) and can determine whether following such a concept yields a useful benefit.

requirements:
Wiling SPO 2007 (B.Sc.)
The course Material Science I [21760] has to be completed beforehand.

Wiling (M.Sc.)
The course Material Science I [21760] has to be completed beforehand.

workload:
The workload for the lecture is 120 h per semester and consists of the presence during the lecture (30 h) as well as preparation and rework time at home (30 h) and preparation time for the oral exam (60 h).

Literature

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
### 7.412 Course: Tax Law I [T-INFO-101315]

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<tr>
<th>Responsible:</th>
<th>Detlef Dietrich</th>
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<td>Organisation:</td>
<td>KIT Department of Informatics</td>
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<td>Part of:</td>
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<tr>
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<tbody>
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Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020
Course: Tax Law II [T-INFO-101314]

**Responsible:** Detlef Dietrich

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101216 - Private Business Law

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**Events**

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<td>Tax Law II</td>
<td>Dietrich</td>
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</table>
# 7.414 Course: Technologies for Innovation Management [T-WIWI-102854]

| Responsible:  | Dr. Daniel Jeffrey Koch |
| Organisation: | KIT Department of Economics and Management |
| Part of:      | M-WIWI-101507 - Innovation Management |

<table>
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**Events**

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<tbody>
<tr>
<td>WS 20/21</td>
<td>Technologies for Innovation Management</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Koch</td>
</tr>
</tbody>
</table>

**Competence Certificate**

Presentation and individual paper (ca. 15 pages) as alternative exam assessment.

**Prerequisites**

None

**Recommendation**

Prior attendance of the course Innovationsmanagement: Konzepte, Strategien und Methoden is recommended.

Below you will find excerpts from events related to this course:

**Technologies for Innovation Management**

2545106, WS 20/21, 2 SWS, Language: German, Open in study portal

**Content**

The seminar “Technologies for Innovation Management” will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

**Literature**

Werden in der ersten Veranstaltung bekannt gegeben.
7.415 Course: Technology Assessment [T-WIWI-102858]

**Responsible:** Dr. Daniel Jeffrey Koch

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-101507 - Innovation Management

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<td>3</td>
<td>see Annotations</td>
<td>1</td>
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</table>

**Competence Certificate**
Alternative exam assessment.

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management is recommended.

**Annotation**
See German version.
7.416 Course: Telecommunication and Internet Economics [T-WIWI-102713]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101406 - Network Economics
M-WIWI-101409 - Electronic Markets

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<td>Written examination</td>
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<td>Each winter term</td>
<td>1</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.

Annotation
Due to the research semester of Prof. Mitusch the course for partial performance will not be offered in the winter semester 2020/2021. An examination will be offered in each semester.
7 COURSES

Course: Telecommunications Law [T-INFO-101309]

### 7.417 Course: Telecommunications Law [T-INFO-101309]

**Responsible:** Dr. Yoan Hermstrüwer  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101217 - Public Business Law

<table>
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**Events**

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<th>Weeks</th>
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<tbody>
<tr>
<td>SS 2020</td>
<td>24632</td>
<td>Telekommunikationsrecht</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Hermstrüwer</td>
</tr>
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</table>

Industrial Engineering and Management M.Sc.  
Module Handbook as of 14/09/2020  
753
7.418 Course: Tendering, Planning and Financing in Public Transport [T-BGU-101005]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:**  
M-BGU-101064 - Fundamentals of Transportation  
M-BGU-101065 - Transportation Modelling and Traffic Management

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</table>

**Events**

| SS 2020 | 6232807 | Wettbewerb, Planung und Finanzierung im ÖPNV | 2 SWS | Lecture (V) | Pischon |

**Competence Certificate**
oral exam, appr. 20 min.

**Prerequisites**  
none

**Recommendation**  
none

**Annotation**  
none
7 COURSES

Course: The negotiation of open innovation [T-WIWI-110867]

<table>
<thead>
<tr>
<th>Responsible:</th>
<th>Dr. Daniela Beyer</th>
</tr>
</thead>
<tbody>
<tr>
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<td>KIT Department of Economics and Management</td>
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**Type**
Examination of another type

**Credits**
3

**Recurrence**
Once

**Version**
1

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<tr>
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</table>

**Competence Certificate**
Non exam assessment.

The following aspects are included in the evaluation:
- Exposé of the seminar paper (15%)
- Preparation of the methodology (15%) (interview guide, quantitative survey, etc.)
- Informed participation and preparation of the simulation game (20%)
- Written elaboration (50%).

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management [2545015] is recommended.

*Below you will find excerpts from events related to this course:*

**Negotiating Open Innovation**
2545105, SS 2020, 2 SWS, Language: German, Open in study portal

**Content**
In times of great challenges, it is no longer sufficient for individual experts to be responsible for innovation success. This is precisely why there is currently so much hype surrounding the topic of Open Innovation. The exchange of knowledge within and between organizations is crucial, but requires the right attitudes and decisions. This seminar examines how this can be achieved in the best possible way, depending on the objectives. By visiting two practitioners from science-economics cooperations and the company’s own Startup Accelerator Programme, theory and practice are linked. Furthermore, a simulation game will take place in the last session, in which the learned will be applied. The grading is based on a group seminar work, which requires an empirical analysis and the preparation of this in the course of the semester (expose, preparation of the methodology) as well as well-informed participation.
7 COURSES

Course: Theory of Endogenous Growth [T-WIWI-102785]

| Responsible: | Prof. Dr. Ingrid Ott |
| Organisation: | KIT Department of Economics and Management |
| Part of: | M-WIWI-101478 - Innovation and Growth  
M-WIWI-101496 - Growth and Agglomeration |

### Competence Certificate

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

### Prerequisites

None

### Recommendation

Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

### Annotation

Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

*Below you will find excerpts from events related to this course:*

**Theory of endogenous growth**

<table>
<thead>
<tr>
<th>Event</th>
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<th>Credits</th>
<th>Recurrence</th>
<th>Version</th>
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<tr>
<td>WS 20/21</td>
<td>2561503</td>
<td>2 SWS</td>
<td>Each winter term</td>
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<tr>
<td>WS 20/21</td>
<td>2561504</td>
<td>1 SWS</td>
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</table>
Content
This course is intended as an introduction to the field of advanced macroeconomics with a special focus on economic growth. Lectures aim to deal with the theoretical foundations of exogenous and endogenous growth models. The importance of growth for nations and discussion of some (well-known) growth theories together with the role of innovation, human capital and environment will therefore be primary focuses of this course.

Learning objective:
Students shall be given the ability to understand, analyze and evaluate selected models of endogenous growth theory.

Course content:
- Intertemporal consumption decision
- Growth models with exogenous saving rates: Solow
- Growth models with endogenous saving rates: Ramsey
- Growth and environmental resources
- Basic models of endogenous growth
- Human capital and economic growth
- Modelling of technological progress
- Diversity Models
- Schumpeterian growth
- Directional technological progress
- Diffusion of technologies

Recommendations:
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Workload:
The total workload for this course is approximately 135.0 hours. For further information see German version.

Exam description:
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Literature
Auszug:
7.421 Course: Tires and Wheel Development for Passenger Cars [T-MACH-102207]

**Responsible:** Hon.-Prof. Dr. Günter Leister

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101265 - Vehicle Development

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<tbody>
<tr>
<td>SS 2020</td>
<td>2114845, Tires and Wheel Development for Passenger Cars</td>
<td>2 SWS, Lecture (V), Leister</td>
</tr>
</tbody>
</table>

**Competence Certificate**

Oral Examination

**Duration:** 30 up to 40 minutes

**Auxiliary means:** none

**Prerequisites**

none

*Below you will find excerpts from events related to this course:*

**Tires and Wheel Development for Passenger Cars**

2114845, SS 2020, 2 SWS, [Open in study portal](#)

**Lecture (V)**

**Content**

1. The role of the tires and wheels in a vehicle
2. Geometrie of Wheel and tire, Package, load capacity and endurance, Book of requirement
3. Mobility strategy, Minispare, runflat systems and repair kit.
4. Project management: Costs, weight, planning, documentation
5. Tire testing and tire properties
6. Wheel technology including Design and manufacturing methods, Wheeltesting
7. Tire pressure: Indirect and direct measuring systems
8. Tire testing subjective and objective

**Learning Objectives:**

The students are informed about the interactions of tires, wheels and chassis. They have an overview of the processes regarding the tire and wheel development. They have knowledge of the physical relationships.

**Organizational issues**

Voraussichtliche Termine, nähere Informationen und eventuelle Terminänderungen:

siehe Institutshomepage.

**Literature**

Manuskript zur Vorlesung

Manuscript to the lecture
### 7.422 Course: Topics in Experimental Economics [T-WIWI-102863]

**Responsible:** Prof. Dr. Johannes Philipp Reiß  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101505 - Experimental Economics

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<td>Topics in Experimental Economics</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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<tr>
<td>SS 2020</td>
<td>2560233</td>
<td>Übungen zu Topics in Experimental Economics</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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</table>

**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.
### 7.423 Course: Trademark and Unfair Competition Law [T-INFO-101313]

**Responsible:** Dr. Yvonne Matz  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101215 - Intellectual Property Law

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#### Events

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<td>24136</td>
<td>Trademark and Unfair Competition Law</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Matz</td>
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</table>
7.424 Course: Traffic Engineering [T-BGU-101798]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101065 - Transportation Modelling and Traffic Management

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**Events**

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<td>Straßenverkehrstechnik</td>
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<td>Vortisch, Mitarbeiter/innen</td>
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</table>

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.425 Course: Traffic Flow Simulation [T-BGU-101800]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:** M-BGU-101065 - Transportation Modelling and Traffic Management

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</table>

**Events**

| SS 2020 | 6232804 | Simulation von Verkehr | 2 SWS | Lecture / Practice (VÜ) | Vortisch, Mitarbeiter/innen |

**Prerequisites**
None

**Recommendation**
None

**Annotation**
None
## 7.426 Course: Traffic Management and Transport Telematics [T-BGU-101799]

**Responsible:** Prof. Dr.-Ing. Peter Vortisch  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101065 - Transportation Modelling and Traffic Management

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<th>Verkehrsmanagement und Telematik</th>
<th>2 SWS</th>
<th>Lecture / Practice (VÜ)</th>
<th>Vortisch</th>
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</table>

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
7.427 Course: Transport Economics [T-WIWI-100007]

**Responsible:**
Prof. Dr. Kay Mitusch  
Dr. Eckhard Szimba

**Organisation:**
KIT Department of Economics and Management

**Part of:**
M-WIWI-101406 - Network Economics  
M-WIWI-101468 - Environmental Economics  
M-WIWI-101485 - Transport Infrastructure Policy and Regional Development

**Type**  
Written examination

**Credits**  
4.5

**Recurrence**  
Each summer term

**Version**  
1

### Events

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<td>SWS</td>
<td>Practice (Ü)</td>
<td>Mitusch, Szimba, Wisotzky</td>
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</table>

### Competence Certificate

The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

**Below you will find excerpts from events related to this course:**

**Transport Economics**  
2560230, SS 2020, SWS, Language: German, [Open in study portal](https://example.com)

**Literature**

**Literatur:**


### 7.428 Course: Transportation Data Analysis [T-BGU-100010]

**Responsible:** Dr.-Ing. Martin Kagerbauer  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101065 - Transportation Modelling and Traffic Management

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**Events**

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<td>Empirische Daten im Verkehrswesen</td>
<td>2 SWS</td>
<td>Kagerbauer</td>
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<td>Each winter term</td>
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</table>

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.429 Course: Transportation Systems [T-BGU-106610]

Responsible: Prof. Dr.-Ing. Peter Vortisch
Organisation: KIT Department of Civil Engineering, Geo- and Environmental Sciences
Part of: M-BGU-101064 - Fundamentals of Transportation

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Events

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<td>6200406</td>
<td>Transportation Systems</td>
<td>Each summer term</td>
<td>2</td>
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</table>

Prerequisites
None

Recommendation
None

Annotation
None
### 7.430 Course: Tunnel Construction and Blasting Engineering [T-BGU-101846]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-101110 - Process Engineering in Construction

<table>
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<td>6241903</td>
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**Tunnelbau und Sprengtechnik**  
Haghsheno, Scheuble, Matz

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
None
### Course: Turnkey Construction I - Processes and Methods [T-BGU-103430]

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101884 - Lean Management in Construction
- M-BGU-101888 - Project Management in Construction

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**Events**

- SS 2020: 6241808 - Schlüsselfertiges Bauen I

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
**7.432 Course: Turnkey Construction II - Trades and Technology [T-BGU-103431]**

**Responsible:** Prof. Dr.-Ing. Shervin Haghsheno

**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences

**Part of:**
- M-BGU-101884 - Lean Management in Construction
- M-BGU-101888 - Project Management in Construction

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**Events**

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<th>Credits</th>
<th>Prerequisites</th>
<th>Recommendation</th>
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<tr>
<td>SS 2020 6241809 Schlüsselfertiges Bauen II (Gewerke und Technik)</td>
<td>2 SWS Lecture / Practice (VÜ)</td>
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<td>Teizer, Denzer</td>
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**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.433 Course: Tutorial Global Production [T-MACH-110981]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101282 - Global Production and Logistics
M-MACH-101284 - Specialization in Production Engineering
M-MACH-105455 - Strategic Design of Modern Production Systems

Events

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<tr>
<td>2149611</td>
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<td>Practice (Ü)</td>
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</tbody>
</table>

Competence Certificate
Alternative achievement (ungraded). Successful completion of the case studies required. Further information will be announced in the course Global Production.

Prerequisites
Global Production must be commenced.

Below you will find excerpts from events related to this course:

Tutorial Global Production
2149611, WS 20/21, 1 SWS, Language: German, [Open in study portal]
Content
The exercise serves as a supplement to the lecture Global Production and deals with the practical implementation of the management of global production networks of manufacturing companies. The contents conveyed in the lecture are put into practice in the exercise and supplemented by lectures from industry and research. The exercise initially builds on a basic understanding of the influencing factors and challenges of global production. Common methods and procedures for planning, designing and managing global production networks are applied in online case studies based on the restructuring of a fictitious company.

According to the lecture, the exercise is divided into three aspects: production strategy, network configuration and network management.

First of all, the exercise shows the connections between the company strategy and the production strategy and highlights the tasks necessary to define a production strategy. Subsequently, in the context of the design of global production networks, methods for site selection, site-specific adaptation of product design and production technology as well as for the establishment of a new production site and the adaptation of existing production networks to changing conditions are taught. With regard to the management of global production networks, the exercise primarily addresses the topic of procurement and supplier management in greater depth.

The topics in detail are:

- Production strategies for global production Networks
- From corporate strategy to production strategy
- Tasks of the production strategy (product portfolio management, recycling management, vertical integration planning, production-related research and development)
- Design of global production Networks
- Ideal-typical network structures
- Planning process for designing the network structure
- Adaptation of the network structure
- Choice of Location
- Production adjustment to suit the Location
- Management of global production Networks
- Coordination in global production Networks
- Procurement process

Learning Outcomes

The students ...

- are able to apply defined procedures for site selection and evaluate a site decision with the help of different Methods.
- are capable of selecting adequate design options for site-specific production and product design on a case-specific basis.
- can explain the central elements of the planning process when setting up a new production site.
- are capable of applying the methods for the design and layout of global production networks to individual Company problems.
- are able to show the challenges and potentials of the corporate divisions sales, procurement and research and development on a global level.

Workload:

e-Learning: ~ 20 h
regular attendance: ~ 10 h
self-study: covered in the course of the lecture.

Organizational issues
Übungstermine freitags 15:45 Uhr - 17:15 Uhr.
Bekanntgabe der konkreten Termine erfolgt über die Institutshomepage.

Die Teilnahme ist an eine Teilnahme der Veranstaltung Globale Produktion gekoppelt. Nur mit einer Teilnahme an der Vorlesung kann die Übung wahrgenommen werden.

Lecture dates on Fridays, 15:45 h - 17:15 h, exact dates will be announced on the Homepage of the institute.

Participation is linked to participation in the course Global Production and Logistics - Part 1: Global Production. Only with a participation in the lecture the exercise can be attended.
### Course: Urban Water Infrastructure and Management [T-BGU-106600]

**Responsibility:** PD Dr.-Ing. Stephan Fuchs  
**Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences  
**Part of:** M-BGU-104448 - Urban Water Technologies

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**Events**

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<td>6223701</td>
<td>Urban Water Infrastructure and Management</td>
<td>4</td>
<td>Lecture / Practice (VÜ)</td>
<td>Fuchs</td>
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</table>

**Competence Certificate**  
Written exam, 60 min.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

None
7.435 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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<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Ruckes</td>
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<td>Practice (Ü)</td>
<td>Ruckes, Luedecke</td>
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</table>

**Competence Certificate**
See German version.

**Prerequisites**
None

**Recommendation**
None

*Below you will find excerpts from events related to this course:*

**Valuation**
2530212, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)

**Content**
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.

**Topics:**
- Projections of cash flows
- Estimation of the cost of capital
- Valuation of the firm
- Mergers and acquisitions
- Real options

**Learning outcomes:** Students are able to
- evaluate complex investment projects by taking a financial view,
- value firms,
- assess the advantageousness of potential merger and acquisitions.

**Literature**
*Weiterführende Literatur*
Course: Vehicle Comfort and Acoustics I [T-MACH-105154]

**Responsible:** Prof. Dr. Frank Gauterin

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-101264 - Handling Characteristics of Motor Vehicles

**Type:** Oral examination

**Credits:** 3

**Recurrence:** Each winter term

**Version:** 1

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<tr>
<td>WS 20/21 2113806</td>
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<td>2 SWS</td>
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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

Below you will find excerpts from events related to this course:

**Vehicle Ride Comfort & Acoustics I**

2114856, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Content**

1. Perception of noise and vibrations

3. Fundamentals of acoustics and vibrations

3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations

4. The relevance of tire and chasis for the acoustic and mechanical driving comfort: phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

**Learning Objectives:**

The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings. They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

**Organizational issues**

Kann nicht mit der Veranstaltung [2113806] kombiniert werden.

Can not be combined with lecture [2113806]

Genaue Termine entnehmen Sie bitte der Institushomepage.

Scheduled dates:

see homepage of the institute.
Literature
2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt

Vehicle Comfort and Acoustics I
2113806, WS 20/21, 2 SWS, Language: German, Open in study portal

Content
1. Perception of noise and vibrations
2. 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.

Learning Objectives:
The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings. They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chassis regarding driving comfort and acoustic under consideration of goal conflicts.

Organizational issues
Kann nicht mit der Veranstaltung [2114856] kombiniert werden.
Can not be combined with lecture [2114856]

Literature
2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006

Das Skript wird zu jeder Vorlesung zur Verfügung gestellt
7.437 Course: Vehicle Comfort and Acoustics II [T-MACH-105155]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-101264 - Handling Characteristics of Motor Vehicles

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Events

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<td>German</td>
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<tr>
<td>SS 2020</td>
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<td>Vehicle Ride Comfort &amp; Acoustics II</td>
<td>German</td>
<td>Gauterin</td>
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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

Below you will find excerpts from events related to this course:

V Vehicle Comfort and Acoustics II
2114825, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)

Content
1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
   - phenomena
   - influencing parameters
   - types of construction
   - optimization of components and systems
   - conflicts of goals
   - methods of development

3. Noise emission of motor vehicles
   - noise stress
   - sound sources and influencing parameters
   - legal restraints
   - optimization of components and systems
   - conflict of goals
   - methods of development

Learning Objectives:
The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.
**Organizational issues**
Kann nicht mit der Veranstaltung [2114857] kombiniert werden.
Can not be combined with lecture [2114857]

**Literature**
Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.

---

**Vehicle Ride Comfort & Acoustics II**
2114857, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Content**
1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
   - phenomena
   - influencing parameters
   - types of construction
   - optimization of components and systems
   - conflicts of goals
   - methods of development

3. Noise emission of motor vehicles
   - noise stress
   - sound sources and influencing parameters
   - legal restraints
   - optimization of components and systems
   - conflict of goals
   - methods of development

**Learning Objectives:**
The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

**Organizational issues**
Genaue Termine entnehmen Sie bitte der Institushomepage.
Kann nicht mit der Veranstaltung [2114825] kombiniert werden.

Scheduled dates:
see homepage of the institute.
Can not be combined with lecture [2114825].

**Literature**
Das Skript wird zu jeder Vorlesung zur Verfügung gestellt.
The script will be supplied in the lectures.
7.438 Course: Vehicle Mechatronics I [T-MACH-105156]

**Responsible:** Prof. Dr.-Ing. Dieter Ammon

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101264 - Handling Characteristics of Motor Vehicles
- M-MACH-101265 - Vehicle Development

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<td>Each winter term</td>
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**Competence Certificate**
Written examination

**Duration:** 90 minutes

**Auxiliary means:** none

**Prerequisites**
none
**7.439 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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<td>2 SWS</td>
<td>Lecture (V)</td>
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<td>WS 20/21 2121353</td>
<td>Exercises Virtual Engineering I</td>
<td>2 SWS</td>
<td>Practice (Ü)</td>
<td>Ovtcharova, Mitarbeiter</td>
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</table>

**Competence Certificate**  
Written examination 90 min.

**Prerequisites**  
None

Below you will find excerpts from events related to this course:

### Virtual Engineering I
**2121352, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)**

**Content**  
The course includes:

- Conception of the product (system approaches, requirements, definitions, structure)
- Generation of domain-specific product data (CAD, ECAD, software, ...) and AI methods
- Validation of product properties and production processes through simulation
- Digital twin for optimization of products and processes using AI methods

After successful attendance of the course, students can:

- conceptualize complex systems with the methods of virtual engineering and continue the product development in different domains
- model the digital product with regard to planning, design, manufacturing, assembly and maintenance.
- use validation systems to validate product and production in an exemplary manner.
- Describe AI methods along the product creation process.

**Literature**  
Vorlesungsfolien / Lecture slides

### Exercises Virtual Engineering I
**2121353, WS 20/21, 2 SWS, Language: English, [Open in study portal](#)**

**Content**  
The theoretical Konzepts and contents of the lecture will be trained within practical relevance by basic functionalities of VE System solutions.

**Organizational issues**  
Practice dates will probably be offered on different afternoons (14:00 - 17:15) in two-week intervals at the IMI in Kriegsstrasse 77 / Übungstermine werden voraussichtlich an unterschiedlichen Nachmittagen (14:00 - 17:15) in zweiwöchigem Rhythmus am IMI in der Kriegsstrasse 77 angeboten.
Literature
Exercise script / Übungsskript
7.440 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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<th>Virtual Engineering II</th>
<th>2/1 SWS</th>
<th>Lecture / Practice (VÜ)</th>
<th>Ovtcharova, Mitarbeiter</th>
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</table>

**Competence Certificate**
Written examination 90 min.

**Prerequisites**
None

*Below you will find excerpts from events related to this course:*

**Virtual Engineering II**
2122378, SS 2020, 2/1 SWS, Language: English, [Open in study portal](#)

**Content**
The course includes:

- Fundamentals (Computer Graphics, VR, AR, MR)
- Hardware and Software Solutions
- Virtual Twin, Validation and application

After successful attendance of the course, students can:

- describe Virtual Reality concepts, as well as explaining and comparing the underlying technologies
- discuss the modeling and computer-internal picture of a VR scene and explain the operation of the pipeline to visualize the scene
- designate different systems to interact with a VR scene and assess the pros and cons of manipulation and tracking devices
- differentiate between static, dynamic and functional Virtual Twins
- describe applications and validation studies with Virtual Twins in the area of building and production

**Organizational issues**
Zusätzliche Übungszeiten (1 SWS) werden zu Vorlesungsbeginn bekannt gegeben / Additional practice times (1 SWS) will be announced at the beginning of the lecture.

**Literature**
Vorlesungsfolien / Lecture slides
7.441 Course: Virtual Engineering Lab [T-MACH-106740]

Responsibility: 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.

Below you will find excerpts from events related to this course:

Virtual Engineering Lab
2123350, SS 2020, 3 SWS, Language: German/English, Open in study portal

Content
- Introduction in Virtual Reality (hardware, software, applications)
- Exercises in the task specific software systems
- Autonomous project work in the area of Virtual Reality in small groups

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Keine / None

Virtual Engineering Lab
2123350, WS 20/21, SWS, Language: German/English, Open in study portal

Content
- Introduction in Virtual Reality (hardware, software, applications)
- Exercises in the task specific software systems
- Autonomous project work in the area of Virtual Reality in small groups

Organizational issues
Siehe Homepage zur Lehrveranstaltung

Literature
Keine / None
### 7.442 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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<td>Virtual training factory 4.X</td>
<td>SWS Project (PRO)</td>
<td>Ovtcharova, Mitarbeiter</td>
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**Competence Certificate**

Assessment of another type (graded), procedure see webpage.

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**Below you will find excerpts from events related to this course:**

#### Virtual training factory 4.X

2123351, SS 2020, SWS, Language: German, [Open in study portal](#)

**Content**

In interdisciplinary teams, the creation of a product is implemented in the style of a start-up. The event is carried out across universities in cooperation with the HsKA.

**Organizational issues**

Lehrveranstaltung fällt im Sommersemester 2020 aus

**Literature**

Keine / None

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#### Virtual training factory 4.X

2123351, WS 20/21, SWS, Language: German, [Open in study portal](#)

**Content**

In interdisciplinary teams, the creation of a product is implemented in the style of a start-up. The event is carried out across universities in cooperation with the HsKA.

**Organizational issues**

Siehe Homepage zur Lehrveranstaltung

**Literature**

Keine / None

---

Industrial Engineering and Management M.Sc.
Module Handbook as of 14/09/2020
7.443 Course: Warehousing and Distribution Systems [T-MACH-105174]

**Responsible:** Prof. Dr.-Ing. Kai Furmans

**Organisation:** KIT Department of Mechanical Engineering

**Part of:**
- M-MACH-101278 - Material Flow in Networked Logistic Systems
- M-MACH-104888 - Advanced Module Logistics

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**Events**

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<td>Warehousing and distribution systems</td>
<td>2 SWS</td>
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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 related to this course:_

**Warehousing and distribution systems**
2118097, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**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

WISSER, Jens (2009)
Der Prozess Lagern und Kommissionieren im Rahmen des Distribution Center Reference Model (DCRM); Karlsruhe: Universitätsverlag

Eine ausführliche Übersicht wissenschaftlicher Paper findet sich bei:

ROODBERGEN, Kees Jan (2007)
Warehouse Literature
### 7.444 Course: Wastewater and Storm Water Treatment Facilities for Industrial Engineers [T-BGU-109051]

- **Responsible:** PD Dr.-Ing. Stephan Fuchs
- **Organisation:** KIT Department of Civil Engineering, Geo- and Environmental Sciences
- **Part of:** M-BGU-104448 - Urban Water Technologies

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#### Events

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<td>Fuchs, Morck</td>
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#### Competence Certificate

report on field trips, appr. 8-15 pages

#### Prerequisites

none

#### Recommendation

none

#### Annotation

none
### 7.445 Course: Water Chemistry and Water Technology I [T-CIWVT-101900]

**Responsible:** Prof. Dr. Harald Horn  
**Organisation:** KIT Department of Chemical and Process Engineering  
**Part of:** M-CIWVT-101121 - Water Chemistry and Water Technology I

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**Events**

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<td>Exercises to Water Technology</td>
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<td>22664</td>
<td>Practical Course in Water Technology</td>
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**Prerequisites**

T-CIWVT-103351 - Wasserchemisches Praktikum must be passed.
7.446 Course: Water Chemistry and Water Technology II [T-CIWVT-101901]

**Responsible:** Prof. Dr. Harald Horn

**Organisation:** KIT Department of Chemical and Process Engineering

**Part of:** M-CIWVT-101122 - Water Chemistry and Water Technology II

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<td>Membrane Technologies in Water Treatment</td>
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<td>WS 20/21</td>
<td>22603</td>
<td>Scientific Principles for Water Quality Assessment</td>
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<td>Lecture (V)</td>
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### Prerequisites

The module "Water Chemistry and Water Technology I" must be passed.
### 7.447 Course: Web App Programming for Finance [T-WIWI-110933]

<table>
<thead>
<tr>
<th>Responsible</th>
<th>Jun.-Prof. Dr. Julian Thimme</th>
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<tr>
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| Part of              | M-WIWI-101480 - Finance 3  
                        | M-WIWI-101483 - Finance 2 |

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**Competence Certificate**

Non exam assessment according to § 4 paragraph 3 of the examination regulation. (Anmerkung: gilt nur für SPO 2015). The grade is made up as follows: 50% result of the project (R-code), 50% presentation of the project.

**Prerequisites**

None

**Recommendation**

The content of the bachelor course Investments is assumed to be known and necessary to follow the course.
7.448 Course: Web Science [T-WIWI-103112]

**Responsible:** Prof. Dr. York Sure-Vetter

**Organisation:** KIT Department of Economics and Management

**Part of:**
- M-WIWI-101472 - Informatics
- M-WIWI-101628 - Emphasis in Informatics
- M-WIWI-101630 - Electives in Informatics

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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**
The lecture will not be offered in the winter semester 2020/2021, but the examination will take place regularly.
## 7.449 Course: Welding Technology [T-MACH-105170]

**Responsible:** Dr. Majid Farajian  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101268 - Specific Topics in Materials Science

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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 related to this course:*
Content
definition, application and differentiation: welding, welding processes, alternative connecting technologies.
history of welding technology
sources of energy for welding processes
Survey: Fusion welding, pressure welding.
weld seam preparation/design
welding positions
weldability
gas welding, thermal cutting, manual metal-arc welding
submerged arc welding
gas-shielded metal-arc welding, friction stir welding, laser beam and electron beam welding, other fusion and pressure welding processes
static and cyclic behavior of welded joints,
fatigue life improvement techniques

learning objectives:
The students have knowledge and understanding of the most important welding processes and its industrial application.
They are able to recognize, understand and handle problems occurring during the application of different welding processes relating to design, material and production.
They know the classification and the importance of welding technology within the scope of connecting processes (advantages/disadvantages, alternatives).
The students will understand the influence of weld quality on the performance and behavior of welded joints under static and cyclic load.
How the fatigue life of welded joints could be increased, will be part of the course.

Organizational issues
Blockveranstaltung im Januar und Februar. Zur Teilnahme an der Vorlesung ist eine Anmeldung beim Dozenten per E-Mail (majid.farajian@kit.edu) bis 30.11.2020 erforderlich. Vorlesungstermine und Hörsaal werden den angemeldeten Teilnehmern Anfang des Jahres mitgeteilt.

Literature
Für ergänzende, vertiefende Studien gibt das
Handbuch der Schweißtechnik von J. Ruge, Springer Verlag Berlin, mit seinen vier Bänden
Band I: Werkstoffe
Band II: Verfahren und Fertigung
Band III: Konstruktive Gestaltung der Bauteile
Band IV: Berechnung der Verbindungen
einen umfassenden Überblick. Der Stoff der Vorlesung Schweißtechnik findet sich in den Bänden I und II. Einen kompakten Einblick in die Lichtbogenschweißverfahren bietet das Bändchen
Nies: Lichtbogenschweißtechnik, Bibliothek der Technik Band 57, Verlag moderne Industrie AG und Co., Landsberg / Lech
Im Übrigen sei auf die zahlreichen Fachbücher des DVS Verlages, Düsseldorf, zu allen Einzelgebieten der Fügetechnik verwiesen.
7.450 Course: Wildcard Key Competences Seminar 1 [T-WIWI-104680]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

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7.451 Course: Wildcard Key Competences Seminar 2 [T-WIWI-104681]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

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Course: Wildcard Key Competences Seminar 3 [T-WIWI-104682]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

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7.453 Course: Wildcard Key Competences Seminar 4 [T-WIWI-104683]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

Type
Examination of another type

Credits
1

Version
1
Course: Wildcard Key Competences Seminar 5 [T-WIWI-104684]

Organisation: University

Part of: M-WIWI-101808 - Seminar Module

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7.455 Course: Wildcard Key Competences Seminar 6 [T-WIWI-104685]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

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**Organisation:** University

**Part of:** M-WIWI-101808 - Seminar Module
7.457 Course: Wildcard Seminar Module Master [T-WIWI-110215]

Organisation: University
Part of: M-WIWI-101808 - Seminar Module

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Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

**Responsible:** Prof. Dr. Hagen Lindstädt

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103119 - Advanced Topics in Strategy and Management

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**Competence Certificate**

In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the performance review will be announced during the lecture.

**Prerequisites**

None

**Recommendation**

Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**

This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

*Below you will find excerpts from events related to this course:*

**Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)**

2577922, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)
Content
In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

Learning Objectives:
Students
- are able to analyze business strategies and derive recommendations for the management
- learn to express their position through compelling reasoning in structured discussions

Recommendations:
Basic knowledge as conveyed in the bachelor module “Strategy and Organization” is recommended.

Workload:
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

Assessment:
In this course, real conflict situations are simulated and analyzed using various methods from business wargaming. Details on the design of the success control will be announced during the lecture.

Note:
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.
The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

Organizational issues
4 Blöcke mittwochs nachmittags
Geb. 05.20 Raum 2A-12.1
siehe Institutshomepage
7.459 Course: Workshop Current Topics in Strategy and Management [T-WIWI-106188]

**Responsible:** Prof. Dr. Hagen Lindstädt

**Organisation:** KIT Department of Economics and Management

**Part of:** M-WIWI-103119 - Advanced Topics in Strategy and Management

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<td>2 SWS</td>
<td>Seminar ($)</td>
<td>Lindstädt</td>
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**Competence Certificate**
The evaluation of the performance takes place through the active participation in the discussion rounds; an appropriate preparation is expressed here and a clear understanding of the topic and framework becomes recognizable. Further details on the design of the performance review will be announced during the lecture.

**Prerequisites**
None

**Recommendation**
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

**Workshop aktuelle Themen Strategie und Management (Master)**
2577923, SS 2020, 2 SWS, Language: German, [Open in study portal](#)
Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Learning Objectives:
Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

Recommendations:
Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

Workload:
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

Assessment:
The assessment of performance is made through active participation in the discussion rounds; adequate preparation is expressed here and a clear understanding of the topic and framework becomes evident. Further details on the design of the success control will be announced during the lecture.

Note:
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

Organizational issues
Geb 05.20, R 2A-12.1 IBU, mittwochs tba
**Content**
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory-based limitations. Critical examination of current research results will be a substantial part of this course.

**Learning Objectives:**
Students

- are able to explain and evaluate theoretical approaches and models in the field of strategic management and can illustrate them by tangible examples
- learn to express their position in structured discussions

**Recommendations:**
Basic knowledge as conveyed in the bachelor module "Strategy and Organization" is recommended.

**Workload:**
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

**Assessment:**
The assessment of performance is made through active participation in the discussion rounds; adequate preparation is expressed here and a clear understanding of the topic and framework becomes evident. Further details on the design of the success control will be announced during the lecture.

**Note:**
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed. Further information on the application process can be found on the IBU website.

The examinations are offered at least every second semester, so that the entire module can be completed in two semesters.

**Organizational issues**
Geb 05.20, R 2A-12.1 IBU, mittwochs tba
7.460 Course: X-ray Optics [T-MACH-109122]

**Responsible:** Dr. Arndt Last  
**Organisation:** KIT Department of Mechanical Engineering  
**Part of:** M-MACH-101291 - Microfabrication  
M-MACH-101292 - Microoptics  

<table>
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<td>Each term</td>
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**Events**

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<td>Lecture (V)</td>
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**Competence Certificate**
oral exam (about 20 min)

**Prerequisites**
none

Below you will find excerpts from events related to this course:

**X-ray optics**  
2141007, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Content**
see Institute homepage

If you are interested, please contact arndt.last@kit.edu by 24.4.2020 to make an appointment.

**Organizational issues**
Interessenten melden sich bitte zur Terminabsprache bis zum 20.4.2020 bei arndt.last@kit.edu

**X-ray Optics**  
2141007, WS 20/21, 2 SWS, Language: German, [Open in study portal](#)

**Organizational issues**
Termin und Ort nach Absprache mit den Angemeldeten

**Literature**
M. Born und E. Wolf  
Principles of Optics, 7th (expanded) edition  
Cambridge University Press, 2010

A. Erko, M. Idir, T. Krist und A. G. Michette  
Modern Developments in X-Ray and Neutron Optics  
Springer Series in Optical Sciences, Vol. 137  
Springer-Verlag Berlin Heidelberg, 2008

D. Attwood  
Soft X-Rays and Extreme Ultraviolet Radiation: Principles and Applications  
Cambridge University Press, 1999