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1 Welcome to the new module handbook of your study programme

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

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

For modules and courses with INFO-Id:

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Personal counselling

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Kaiserstraße 89  
D-76133 Karlsruhe  
https://www.wiwi.kit.edu/
2 About this handbook

2.1 Notes and rules

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

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

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

2.1.1 Begin and completion of a module

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

2.1.2 Module versions

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

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

2.1.3 General and partial examinations

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

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

For further and more detailed information, https://studium.kit.edu/Seiten/FAQ.aspx.

2.1.4 Types of exams

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

2.1.5 Repeating exams

Principally, a failed written exam, oral exam or alternative exam assessment can repeated only once. If the repeat examination (including an eventually provided verbal repeat examination) will be failed as well, the examination claim is lost. A request for a
second repetition has to be made in written form to the examination committee two months after loosing the examination claim. A counseling interview is mandatory.

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

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

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

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

2.2 Contact persons
for Bachelor students

Personal consultation: KIT Department of Informatics, Informatics Study Program Service
Informatics Building 50.34, EG, Rooms 001.2/.3
bachelor@wirtschaftsinformatik.kit.edu

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Gebäude am Kronenplatz Building 05.20, 3rd floor, Room 3C-05
master@wirtschaftsinformatik.kit.edu

editorial responsibility:

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Phone: +49 721 608-44061
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3 The Master’s degree program in Information Engineering and Management

3.1 Qualification objectives of the Master's program in Information Engineering and Management

Graduates of the interdisciplinary, four-semester Master’s program in Information Engineering and Management have an advanced and in-depth research-based knowledge in the fields of informatics, economics and law as well as subject-independent competences that can be applied across multiple disciplines.

By combining their knowledge and competences, they are in a position to independently acknowledge economic and IT opportunities and development potentials for innovative change of structures and processes and implement them within the applicable legal framework. They are able to analyze, structure and describe complex, field-related problems and challenges.

They know how to identify advantages and disadvantages of existing procedures, models, technologies and approaches, compare alternatives, evaluate critically and apply the findings to new application areas.

If necessary, they are also in a position to combine different approaches, adapt them accordingly or even independently develop and apply new and innovative solutions.

They know how to critically interpret, validate and illustrate the achieved results.

Their decisions are made independently based on scientific facts under consideration of social and ethical aspects.

The graduates can communicate with expert representatives on a scientific level and even assume prominent responsibility in a team. Karlsruhe’s Infonomics experts are characterized by their interdisciplinary methodological skills and innovative abilities.

Their qualifications are perfectly ideal particularly for interdisciplinary occupations in the fields of Information and Communication Technology (ICT), controlling, consulting, management and organization, for starting and management of firms as well as a downstream scientific career (PhD).

3.2 Structure of the Master's degree program in Information Engineering and Management SPO 2015

The Master’s degree program in Information Engineering and Management has 4 terms. The terms 1 to 3 of the program are method-oriented and provide the students with state-of-the-art knowledge in informatics, business administration, operations research, economics, statistics and law. The interdisciplinary approach is especially emphasized in the interdisciplinary seminar.

It is recommended to study the courses in the following sequence:

- The (mandatory) modules in business administration and operations research should be studied in the first two terms of the program.
- The interdisciplinary seminar module should be taken until the end of the third term of the program.
- The (elective) modules from business administration, economics, operations research, and statistics, from informatics, and from law should be studied in the first three terms of the program.
- The 4-th term is reserved for the Master Thesis in which the student proves his ability for independent scientific research in informatics, the economic sciences, and law.

Figure 2 shows a summary of this recommendation with the structure of the disciplines and with credit points allocated to the modules of the program.
<table>
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<tr>
<th>Term</th>
<th>Credits</th>
<th>Informatics</th>
<th>Economics and Management</th>
<th>Law</th>
<th>Research Course</th>
<th>Master Thesis</th>
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<td>Master Thesis</td>
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<td>BUS 10 CP</td>
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<td>30.5</td>
<td>INFO 8 CP</td>
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<td>BUS/ECON/ OR/STAT 9 CP</td>
<td>Law 9 CP</td>
<td>2 Seminars 3 CP + 3 CP</td>
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<td>3</td>
<td>32.5</td>
<td>INFO 9 CP</td>
<td>BUS/ECON/ OR/STAT 9 CP</td>
<td>Law 9 CP</td>
<td>2 Seminars 3 CP + 3 CP</td>
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<td>4</td>
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<td></td>
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<td>Master Thesis 30 CP</td>
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Figure 2: Structure of the Master's degree program in Information Engineering and Management SPO 2015 (Recommendation)
## 4 Field of study structure

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### 4.1 Master Thesis

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### 4.2 Informatics

**Election block: Informatics (at least 33 credits)**

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<td>Advanced Algorithms: Engineering and Applications</td>
<td>9 CR</td>
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<td>M-INFO-100795</td>
<td>Algorithm Engineering</td>
<td>5 CR</td>
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<td>M-INFO-100031</td>
<td>Algorithms for Routing</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INFO-100797</td>
<td>Algorithms in Cellular Automata</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INFO-102094</td>
<td>Algorithms for Visualization of Graphs</td>
<td>5 CR</td>
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### Advanced Topics in Strategy and Management (9 CR)
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### Environmental Economics (9 CR)
- M-WIWI-101485

### Transport Infrastructure Policy and Regional Development (9 CR)
- M-WIWI-101485

### Advanced Topics in Public Finance (9 CR)
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### Growth and Agglomeration (9 CR)
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#### Election block: Elective Modules in Business Administration (9 credits)

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5.1 Module: Advanced Algorithms: Design and Analysis [M-INFO-101199]

**Responsible:** Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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<td>Algorithms for Visualization of Graphs</td>
<td>5 CR</td>
<td>Wagner</td>
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<td>T-INFO-104374</td>
<td>Laboratory Course Algorithm Engineering</td>
<td>6 CR</td>
<td>Sanders, Wagner</td>
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<td>Algorithm Engineering</td>
<td>5 CR</td>
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<tr>
<td>T-INFO-100002</td>
<td>Algorithms for Routing</td>
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</table>

**Competence Goal**

The student

- knows advanced methodical approaches with respect to the design and analysis of algorithms,
- can comment on theoretical aspects of algorithmics in a qualified and well-structured manner,
- identifies algorithmic problems from different areas and can formulate these formally,
- can analyze and judge the computational complexity of algorithmic problems from different areas,
- can recognize and design suitable algorithmic techniques to solve algorithmic problems.

**Content**

This module conveys profound knowledge concerning theoretical aspects of algorithmics. Its focus is on the design and analysis of advanced algorithms, particularly, on algorithms for graphs, randomized algorithms, parallel algorithms and algorithms for NP-hard problems.

**Workload**

approx. 270h
5.2 Module: Advanced Algorithms: Engineering and Applications [M-INFO-101200]

**Responsible:** Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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**Election block: Engineering and Applications / Design and Analysis (at least 1 item as well as at least 9 credits)**

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<td>T-INFO-103334</td>
<td>Algorithmic Methods for Hard Optimization Problems</td>
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<td>Randomized Algorithms</td>
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**Competition Goal**

The Student

- knows advanced methodical approaches concerning the design of algorithms and their applications,
- can comment on the practical aspects of algorithmics in a qualified and well-structured manner,
- identifies algorithmic problems from different areas of application and can formulate these formally,
- can judge the computational complexity of algorithmic problems,
- recognizes suitable algorithmic techniques for solving these problems and can transfer and apply knowledge of these techniques to new problems,
- can implement solutions based on algorithmic techniques for practical problems and can evaluate these

**Prerequisites**

None

**Content**

This module conveys profound knowledge concerning practical aspects of algorithmics and covers applications of algorithms for practical problems. Its focus is on the design, the practical implementation and the evaluation of algorithms, particularly, algorithms for graphs, parallel algorithms, algorithms for NP-hard problems, optimization algorithms inspired by nature, as well as algorithms from various areas of application.

**Workload**

270h
5.3 Module: Advanced Topics in Cryptography [M-INFO-101198]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: Informatics

Election block: Advanced Topics in Cryptography (at least 1 item as well as at least 9 credits)

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<tr>
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<td>Asymmetric Encryption Schemes</td>
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<td>3 CR</td>
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</table>

Competence Goal
The student

- will be familiar with the theoretical foundations and the basic mechanisms of computer security and cryptography.
- can understand and explain the methods of computer security and cryptography,
- will be able to read and understand the latest scientific papers,
- will be able to critically assess appropriate security solutions, and identify weaknesses / threats,
- can design an own security solution to a given problem, (eg. later in the a master’s thesis).

Prerequisites
None

Content
The module is intended to provide depth theoretical and practical aspects of IT security and cryptography.

- Development of safety goals and classification of threats.
- Formal description of authentication systems.
- Analysis of typical vulnerabilities in programs and web applications and development of appropriate protective methods / avoidance strategies
- Overview of opportunities for side channel attacks
- Introduction to key management and Public Key Infrastructure
- Presentation and comparison of current safety certifications.
- The current research issues from some of the following areas are covered:
  - Block ciphers, hash functions,
  - Public-key encryption, digital signature, key exchange.
  - Basic security protocols such as fair coin toss over the phone, Byzantine Agreement, Dutch Flower Auctions, Zero Knowledge.
  - Threat models and security definitions.
  - Modular design and protocol composition.
  - Security definitions of simulatability.
  - Universal Composability.
  - Deniability as an additional safety feature.
  - Electronic Voting.
5.4 Module: Advanced Topics in Public Finance [M-WIWI-101511]

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

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**Election block: Supplementary Courses (between 4.5 and 5 credits)**

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<td>T-WIWI-108711</td>
<td>Basics of German Company Tax Law and Tax Planning</td>
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**Competence Certificate**

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

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

**Competence Goal**

The student

- understands 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.
5.5 Module: Advanced Topics in Strategy and Management [M-WIWI-103119]

**Responsible:** Prof. Dr. Hagen Lindstädt

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)
Economics and Management (Elective Modules in Business Administration)

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

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<tr>
<td>T-WIWI-106188</td>
<td>Workshop Current Topics in Strategy and Management</td>
<td>3 CR</td>
<td>Each term</td>
<td>German</td>
<td>Lindstädt</td>
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<tr>
<td>T-WIWI-106189</td>
<td>Workshop Business Wargaming – Analyzing Strategic Interactions</td>
<td>3 CR</td>
<td>Each term</td>
<td>German</td>
<td>Lindstädt</td>
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<tr>
<td>T-WIWI-106190</td>
<td>Strategy and Management Theory: Developments and “Classics”</td>
<td>3 CR</td>
<td>Each term</td>
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<td>Lindstädt</td>
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**Competition 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.
### 5.6 Module: Algorithm Engineering [M-INFO-100795]

**Responsible:** Prof. Dr. Peter Sanders  
Prof. Dr. Dorothea Wagner  

**Organisation:** KIT Department of Informatics  
Part of: Informatics

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<td>Sanders, Wagner</td>
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Competence Goal
The goal of this course is to familiarize the students with hard problems and possible approaches to solve them. Online problems may also be part of the course.

Content
There are many practical problems that cannot be solved optimally - some not at all and some not in a reasonable amount of time. An example is the "bin packing problem" where a collection of objects must be packed using a possibly small number of bins. Moreover, problems sometimes arise where knowledge about the future (or even about the present) is incomplete, but a decision is required nevertheless ("online problems"). Regarding bin packing, for example, there must be a point in time when you close the bins and send them away. Even if there are some more objects arriving later.
### 5.8 Module: Algorithmic Methods for Network Analysis [M-INFO-102400]

**Responsible:** Dr. rer. nat. Torsten Ueckerdt  
Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics  

<table>
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**Workload**  
150 h
### 5.9 Module: Algorithms for Routing [M-INFO-100031]

**Responsible:** Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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#### Mandatory

| T-INFO-100002 | Algorithms for Routing | 5 CR | Wagner |
5.10 Module: Algorithms for Visualization of Graphs [M-INFO-102094]

**Responsible:** Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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5.11 Module: Algorithms II [M-INFO-101173]

**Responsible:**
- Prof. Dr. Hartmut Prautzsch
- Prof. Dr. Peter Sanders
- Prof. Dr. Dorothea Wagner

**Organisation:**
- KIT Department of Informatics

**Part of:**
- Informatics

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### 5.12 Module: Algorithms in Cellular Automata [M-INFO-100797]

| Responsible: | Thomas Worsch |
| Organisation: | KIT Department of Informatics |
| Part of: | Informatics |

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

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

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Election block: Supplementary Courses (between 4.5 and 5 credits)

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<td>Machine Learning 2 – Advanced Methods</td>
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<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.
Module: Applied Strategic Decisions [M-WIWI-101453]

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

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Election block: Supplementary Courses (between 45 and 5 credits)

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<td>Incentives in Organizations</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 core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal

Students

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

Prerequisites

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

Content

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

Recommendation

Basic knowledge in game theory is assumed.

Annotation

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

Workload

The total workload for this module is approximately 270 hours. The exact distribution is made according to the credit points of the courses of the module.
5.15 Module: Artificial Intelligence [M-WIWI-105366]

Responsibilities: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management

Part of: Informatics

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Election block: Compulsory Elective Courses (at least 2 items)

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<td>T-WIWI-110848</td>
<td>Semantic Web Technologies</td>
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<td>Sure-Vetter</td>
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<td>Advanced Lab Informatics (Master)</td>
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Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student
- understands the concepts behind Semantic Web and Linked Data technologies
- develops ontologies to be employed in semantic web-based applications and chooses suitable representation languages,
- is familiar with approaches in the area of knowledge representation and modelling,
- is able to transfer the methods and technologies of semantic web technologies to new application sectors,
- evaluates the potential of semantic web for new application sectors,
- understands the challenges in the areas of Data and system integration on the web is able to develop solutions.
- know the basics of machine learning, data mining and knowledge discovery
- can design, train and evaluate systems that are capable of learning
- carry out knowledge discovery projects, taking into account algorithms, representations and applications.

Prerequisites
None

Content
The focus of the module is on Semantic Web Technologies as well as machine learning and data mining methods for knowledge acquisition from large databases.

The goal of the semantic web is the meaning (semantics) of data on the web for intelligent systems, e.g. in e-commerce and to make Internet portals usable. The representation of knowledge in the form of RDF and ontologies, the provision of data as Linked Data, as well as the request of data using SPARQL. In this lecture the basics of knowledge representation and processing for the corresponding technologies and application examples are presented.

The lecture "Knowledge Discovery" gives an overview of approaches of machine learning and data mining for knowledge extraction from large data sets. These are examined especially with regard 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.

Workload
The total workload for this module is approximately 270 hours.
### Module: Automated Planning and Scheduling [M-INFO-104447]

**Responsible:** Prof. Dr. Peter Sanders  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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<td>6 CR Beyerer</td>
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</table>
### 5.18 Module: Autonomous Robotics [M-INFO-101251]

**Responsible:** Prof. Dr.-Ing. Rüdiger Dillmann  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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**Election block: Autonomous Robotics (at least 1 item as well as at least 9 credits)**

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<td>T-INFO-109931</td>
<td>Robotics III - Sensors and Perception in Robotics</td>
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<td>T-INFO-105723</td>
<td>Robotics II: Humanoid Robotics</td>
<td>3 CR</td>
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**Prerequisites**  
None
5.19 Module: Big Data Analytics [M-INFO-100768]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

Credits: 5
Recurrence: Each winter term
Duration: 1 term
Language: German
Level: 4
Version: 1

Mandatory

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### 5.20 Module: Big Data Analytics 2 [M-INFO-102773]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics  

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<td>3 CR</td>
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5.21 Module: Business & Service Engineering [M-WIWI-101410]

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

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

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<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</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>
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<td>T-WIWI-102848</td>
<td>Personalization and Services</td>
<td>4.5 CR</td>
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<td>Recommender Systems</td>
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<td>Practical Seminar Service Innovation</td>
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<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 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.
5.22 Module: Cognitive Systems [M-INFO-100819]

**Responsible:** Prof. Dr.-Ing. Rüdiger Dillmann  
Prof. Dr. Alexander Waibel

**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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

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

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Election block: Compulsory Elective Courses ()

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<td>T-WIWI-102859</td>
<td>Social Choice Theory</td>
<td>4.5 CR</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The overall grade of the 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.
5.24 Module: Communication and Database Systems [M-INFO-101178]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm
Prof. Dr. Martina Zitterbart

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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<td>4 CR</td>
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<td>T-INFO-102015</td>
<td>Introduction in Computer Networks</td>
<td>4 CR</td>
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**Competence Goal**
The students will

- have learned fundamentals of data communication as well as the design of communication systems,
- be familiar with the composition of the different protocols and their mechanisms and be able to design simple protocols on their own,
- have understood the relationships between the different communication layers,
- be able to explain the benefits of database technology at the end of the course,
- have understood the development of database applications and be able to set up and access simple databases,
- be familiar with the terminology and the underlying database theory.

**Content**
Distributed information systems are worldwide information repositories which are accessible by everybody at any place of the world at any time. The physical distance is bridged by telecommunication systems, while database management technology manages and coordinates data for arbitrary periods of time. In order to understand globally running processes, one has to understand both data transmission techniques and database technology. Besides the telecommunication and database technologies on their own, an understanding of their cooperation is required, too.

**Workload**
approx. 240 h
## 5.25 Module: Computational Complexity Theory, with a View Towards Cryptography [M-INFO-101575]

**Responsible:** Prof. Dr. Jörn Müller-Quade  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics  

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5.26 Module: Computational Geometry [M-INFO-102110]

**Responsible:** Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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5.27 Module: Context Sensitive Systems [M-INFO-100728]

**Responsible:** Prof. Dr.-Ing. Michael Beigl

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

- **Credits:** 5
- **Recurrence:** Each summer term
- **Language:** German
- **Level:** 4
- **Version:** 2

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5.28 Module: Critical Digital Infrastructures [M-WIWI-104403]

**Responsible:** Prof. Dr. Ali Sunyaev
**Organisation:** KIT Department of Economics and Management
**Part of:** Informatics

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

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<td>Sociotechnical Information Systems Development</td>
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<td>T-WIWI-109251</td>
<td>Selected Issues in Critical Information Infrastructures</td>
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**Competence Certificate**
The assessment is carried out as partial exams according to § 4 paragraph 2 Nr. 1 – Nr. 3 SPO of the examination regulation of the core course and further single courses of this module, whose sum of credits must meet 9 credits.
The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with credit points and is cut off after the first comma point.

**Competence Goal**
The students ...

- have foundational knowledge about the design and operation of critical digital infrastructures
- have in-depth methodological knowledge in design science research and related scientific domains
- can distinguish between the challenges and opportunities of critical digital infrastructures in different domains
- can evaluate and improve sociotechnical systems
- combine theoretical and practical contents of the courses in the module to solve existing problems in the domain of critical digital infrastructures

**Prerequisites**
None

**Content**
Critical digital infrastructures are sociotechnical systems comprising essential software components and information systems with pivotal impact on individuals, organizations, governments, economies, and society. Critical information infrastructures require careful design, development, and evaluation to ensure reliable, secure, and purposeful operation. This module features a strong focus on different subject areas, including, but not limited to, internet technologies, health care, and information privacy. The lectures in the module introduce students to a domain relevant to critical digital infrastructures and the labs allow to gain hands-on experience in this interesting domain.

**Recommendation**
The courses in the module may be held in English. Participants should be well versed in written and spoken English.
The courses can be visited independently. Participants can start the module in the winter as well as in the summer term.
Programming skills may be required in some courses.
Experience in writing scientific papers is helpful but not required.

**Annotation**
This new module can be chosen from summer term 2018.

**Workload**
30 hours per ECTS
Total workload for 9 ECTS: approx. 270 hours
The exact allocation is made according to the credit points of the courses.
## 5.29 Module: Cross-Functional Management Accounting [M-WIWI-101510]

**Responsible:** Prof. Dr. Marcus Wouters  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Elective Modules in Economics and Management)  
**Credits:** 9  
**Recurrence:** Each term  
**Language:** German/English  
**Level:** 4  
**Version:** 8

### Mandatory

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### Election block: Supplementary Courses (4,5 credits)

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<td>Extraordinary additional course in the 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.
5.30 Module: Data Privacy: From Anonymization to Access Control [M-INFO-104045]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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<td>3 CR</td>
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5 MODULES

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

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

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<td>T-WIWI-110213</td>
<td>Python for Computational Risk and Asset Management</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 and 3 of the examination regulation) of the single courses of this module.
The assessment of "Computational Risk and Asset Management" is carried out in form of a written exam (90 minutes), the assessment of "Python for Computational Risk and Asset Management" is carried out in form of twelve weekly Python programming tasks and offered each winter term.
The overall grade of the module is the grade of the written exam weighted with factor 0.75 and the grade for the Python programming tasks weighted with factor 0.25. The resulting grade is truncated after the first decimal.

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

Content
The module covers several topics, among them:

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

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

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module. The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.
5.32 Module: Data Science: Advanced CRM [M-WIWI-101470]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management) Economics and Management (Elective Modules in Business Administration)

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<td>T-WIWI-109921 Advanced Machine Learning 4.5 CR Geyer-Schulz, Nazemi</td>
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<td>T-WIWI-102762 Business Dynamics 4.5 CR Geyer-Schulz</td>
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<td>T-WIWI-103549 Intelligent CRM Architectures 4.5 CR Geyer-Schulz</td>
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<td>T-WIWI-102848 Personalization and Services 4.5 CR Sonnenbichler</td>
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<td>T-WIWI-102847 Recommender Systems 4.5 CR Geyer-Schulz</td>
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<tr>
<td>T-WIWI-105778 Service Analytics A 4.5 CR Fromm</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.

**Competition 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.
5.33 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: Economics and Management (Elective Modules in Economics and Management)
Economics and Management (Elective Modules in Business Administration)

Credits 9
Recurrence Each term
Language German/English
Level 4
Version 6

Election block: Compulsory Elective Courses ()

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<td>Business Data Analytics: Application and Tools</td>
<td>4,5 CR</td>
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<td>Business Data Strategy</td>
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<td>Service Analytics A</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.
5.34 Module: Data Science: Data-Driven User Modeling [M-WIWI-103118]

Responsibel: Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of: Economics and Management (Elective Modules in Economics and Management)
Economics and Management (Elective Modules in Business Administration)

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

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

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

Competence Goal
Students of this module

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

Prerequisites
None

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

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

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

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

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

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

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

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

Competence Goal
Students

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

Prerequisites
Keine.

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

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

Recommendation
None

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
## 5.36 Module: Datamanagement in the Cloud [M-INFO-100769]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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5.37 Module: Deep Learning and Neural Networks [M-INFO-104460]

**Responsible:** Prof. Dr. Alexander Waibel

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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**Mandatory**

| T-INFO-109124 | Deep Learning and Neural Networks | 6 CR | Waibel |

Information Engineering and Management M.Sc.
Module Handbook as of 18.02.2020
### 5.38 Module: Deployment of Database Systems [M-INFO-100780]

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<th>Responsible</th>
<th>Prof. Dr.-Ing. Klemens Böhm</th>
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<td>Deployment of Database Systems</td>
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5.39 Module: Designing Interactive Information Systems [M-WIWI-104080]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)
Economics and Management (Elective Modules in Business Administration)

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

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<td>4.5</td>
<td>Mädche</td>
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<tr>
<td>T-WIWI-108437</td>
<td>Practical Seminar: Information Systems and Service Design</td>
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**Competence Certificate**

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

**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.
5.40 Module: "Development of Business Information Systems [M-WIWI-101477]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: Informatics

Election block: Compulsory Elective Courses (between 1 and 2 items)

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Title</th>
<th>Credits</th>
<th>Recurrence</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>T-WIWI-102661</td>
<td>Database Systems and XML</td>
<td>4.5 CR</td>
<td>Each term</td>
<td>German</td>
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<tr>
<td>T-WIWI-102895</td>
<td>Software Quality Management</td>
<td>4.5 CR</td>
<td>Each term</td>
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Election block: Supplementary Courses (at most 1 item)

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<th>Recurrence</th>
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<tr>
<td>T-WIWI-110346</td>
<td>Supplement Enterprise Information Systems</td>
<td>4.5 CR</td>
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<td>T-WIWI-102667</td>
<td>Management of IT-Projects</td>
<td>4.5 CR</td>
<td>Each term</td>
<td>German</td>
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<tr>
<td>T-WIWI-110548</td>
<td>Advanced Lab Informatics (Master)</td>
<td>4.5 CR</td>
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<tr>
<td>T-WIWI-102669</td>
<td>Strategic Management of Information Technology</td>
<td>4.5 CR</td>
<td>Each term</td>
<td>German</td>
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Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students
- describe the structure and the components of enterprise information systems,
- explain functionality and architecture of the enterprise information system components,
- choose and apply relevant components to solve given problems in a methodic approach,
- describe roles, activities and products in the field of software engineering management,
- compare process and quality models and choose an appropriate model in a concrete situation,
- write scientific theses in the areas of enterprise information system components and software engineering management and find own solutions for given problems and research questions.

Prerequisites
The course "Datenbanksysteme und XML" or the course "Software Quality Management" must be examined.

Content
An enterprise information system contains the complete application software to store and process data and information in an organisation including design and management of databases, workflow management and strategic information planning.

Due to global networking and geographical distribution of enterprises as well as the increasing acceptation of eCommerce the application of distributed information systems becomes particular important.

This module teaches concepts and methods for design and application of information systems.

Annotation
The course T-WIWI-102759 "Requirements Analysis and Requirements Management" will no longer be offered in the module as of winter semester 2018/2019.

Workload
See German version
5.41 Module: Digital Circuits Design [M-INFO-102978]

**Responsible:** Prof. Dr.-Ing. Uwe Hanebeck

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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<thead>
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**Mandatory**

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<td>T-INFO-103469</td>
<td>Digital Circuits Design</td>
<td>6</td>
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5.42 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: Economics and Management (Elective Modules in Economics and Management)  
Economics and Management (Elective Modules in Business Administration)

<table>
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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-102872</td>
<td>Challenges in Supply Chain Management</td>
<td>4.5</td>
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<tr>
<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
<td>4.5</td>
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<td>T-WIWI-102822</td>
<td>Industrial Services</td>
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<td>T-WIWI-107043</td>
<td>Liberalised Power Markets</td>
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<td>Fichtner</td>
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<td>T-WIWI-106200</td>
<td>Modeling and OR-Software: Advanced Topics</td>
<td>4.5</td>
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<tr>
<td>T-WIWI-106563</td>
<td>Practical Seminar Digital Service Systems</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

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

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

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

Recommendation
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
5.43 Module: Dynamic IT-Infrastructures [M-INFO-101210]

**Responsible:** Prof. Dr. Hannes Hartenstein

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

<table>
<thead>
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**Election block: Dynamic IT-Infrastructures (at least 1 item as well as at least 9 credits)**

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<tr>
<td>T-INFO-101323</td>
<td>IT-Security Management for Networked Systems</td>
<td>5 CR</td>
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<tr>
<td>T-INFO-101326</td>
<td>Ubiquitous Computing</td>
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<td>T-INFO-101276</td>
<td>Data and Storage Management</td>
<td>4 CR</td>
<td>Neumair</td>
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<td>T-INFO-101284</td>
<td>Integrated Network and Systems Management</td>
<td>4 CR</td>
<td>Neumair</td>
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<td>T-INFO-101298</td>
<td>Distributed Computing</td>
<td>4 CR</td>
<td>Streit</td>
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<tr>
<td>T-INFO-101345</td>
<td>Parallel Computer Systems and Parallel Programming</td>
<td>4 CR</td>
<td>Streit</td>
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</table>

**Competence Goal**
The students will get to know established as well as novel concepts for the design, implementation, operation and management of dynamic IT infrastructures (Web, Grid, Cloud, Internet):

- Getting to know established and novel concepts for IT infrastructures
- Application of methods for the evaluation and analysis of dynamic IT infrastructures
- Assessment of tools, protocols and procedures for the operation and management of dynamic IT infrastructures
- Assessment of the strengths and weaknesses of IT infrastructures
- Insight into the practical operation of dynamic IT infrastructures using the example of the operation within the Steinbuch Centre for Computing (SCC)

**Prerequisites**
None

**Content**
This module covers various aspects of dynamic IT infrastructures such as layout, design, concept, development, operation and performance evaluation as well as optimization. These topics are considered from a theoretical-analytical approach as well as from the perspective of the practical experiences of day-to-day use. Being a modern IT service provider, the Steinbuch Centre for Computing (SCC) serves as object of study, since it combines both aspects in real life.
5.44 Module: Econometrics and Statistics I [M-WIWI-101638]

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

<table>
<thead>
<tr>
<th>Credits</th>
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<th>Language</th>
<th>Level</th>
<th>Version</th>
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<tr>
<td>T-WIWI-103125</td>
<td>Applied Econometrics</td>
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**Election block: Supplementary Courses (between 4.5 and 5 credits)**

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<tbody>
<tr>
<td>T-WIWI-103066</td>
<td>Data Mining and Applications</td>
<td>4.5 CR</td>
<td>Nakhaeizadeh</td>
</tr>
<tr>
<td>T-WIWI-103064</td>
<td>Financial Econometrics</td>
<td>4.5 CR</td>
<td>Schienle</td>
</tr>
<tr>
<td>T-WIWI-103126</td>
<td>Non- and Semiparametrics</td>
<td>4.5 CR</td>
<td>Schienle</td>
</tr>
<tr>
<td>T-WIWI-103127</td>
<td>Panel Data</td>
<td>4.5 CR</td>
<td>Heller</td>
</tr>
<tr>
<td>T-WIWI-103065</td>
<td>Statistical Modeling of Generalized Regression Models</td>
<td>4.5 CR</td>
<td>Heller</td>
</tr>
</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 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.
### 5.45 Module: Econometrics and Statistics II [M-WIWI-101639]

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

<table>
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<th>Language</th>
<th>Level</th>
<th>Version</th>
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<tbody>
<tr>
<td>9</td>
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**Election block: Wahlpflichtangebot (between 9 and 10 credits)**

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<th>Credits</th>
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<tbody>
<tr>
<td>T-WIWI-103066</td>
<td>Data Mining and Applications</td>
<td>4.5 CR</td>
<td>Nakhaezadeh</td>
</tr>
<tr>
<td>T-WIWI-103064</td>
<td>Financial Econometrics</td>
<td>4.5 CR</td>
<td>Schienle</td>
</tr>
<tr>
<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</td>
<td>4.5 CR</td>
<td>Grothe</td>
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<tr>
<td>T-WIWI-103126</td>
<td>Non- and Semiparametrics</td>
<td>4.5 CR</td>
<td>Schienle</td>
</tr>
<tr>
<td>T-WIWI-103127</td>
<td>Panel Data</td>
<td>4.5 CR</td>
<td>Heller</td>
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<tr>
<td>T-WIWI-103128</td>
<td>Portfolio and Asset Liability Management</td>
<td>4.5 CR</td>
<td>Safarian</td>
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<td>Statistical Modeling of Generalized Regression Models</td>
<td>4.5 CR</td>
<td>Heller</td>
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<tr>
<td>T-WIWI-103129</td>
<td>Stochastic Calculus and Finance</td>
<td>4.5 CR</td>
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**Competence Certificate**
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

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

**Prerequisites**
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]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)

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

<table>
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<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory</td>
<td>4.5 CR</td>
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<tr>
<td>T-WIWI-102861</td>
<td>Advanced Game Theory</td>
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<td>Ehrhart, Puppe, Reiß</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>
<td>Ruckes, Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102622</td>
<td>Corporate Financial Policy</td>
<td>4.5 CR</td>
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<td>Corporate Risk Management</td>
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<td>Financial Intermediation</td>
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<td>Ruckes</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 “Finanzintermediation” will apply the techniques of contract theory to issues of corporate finance and financial institutions.

**Workload**

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

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

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

<table>
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<th>Course Title</th>
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<td>Energy Networks and Regulation</td>
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<tr>
<td>T-WIWI-107504</td>
<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.
5.48 Module: Electronic Markets [M-WIWI-101409]

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

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

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Name</th>
<th>Credits</th>
<th>Lecturer(s)</th>
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<tbody>
<tr>
<td>T-WIWI-108880</td>
<td>Blockchains &amp; Cryptofinance</td>
<td>4.5 CR</td>
<td>Schuster, Uhrig-Homburg</td>
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<td>T-WIWI-102762</td>
<td>Business Dynamics</td>
<td>4.5 CR</td>
<td>Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102886</td>
<td>Business Administration in Information Engineering and Management</td>
<td>5 CR</td>
<td>Geyer-Schulz</td>
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<tr>
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<td>Market Engineering: Information in Institutions</td>
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<td>Price Management</td>
<td>4.5 CR</td>
<td>Geyer-Schulz, Glenn</td>
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<tr>
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<td>Telecommunication and Internet Economics</td>
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</table>

**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.

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

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Mandatory

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Election block: Supplementary Courses (at least 6 credits)

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<tr>
<td>T-WIWI-102691</td>
<td>Energy Trade and Risk Management</td>
<td>3 CR</td>
<td>Cremer, Keles</td>
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<td>T-WIWI-102607</td>
<td>Energy Policy</td>
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<td>Simulation Game in Energy Economics</td>
<td>3 CR</td>
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<td>T-WIWI-107446</td>
<td>Quantitative Methods in Energy Economics</td>
<td>3 CR</td>
<td>Keles, Plötz</td>
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<tr>
<td>T-WIWI-102712</td>
<td>Regulation Theory and Practice</td>
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Competence Certificate

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

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal. Additional courses might be accredited upon request.

Competence Goal

The student

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

Prerequisites

The lecture Liberalised Power Markets has to be examined.

Content

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

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

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

Recommendation

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

Workload

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

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

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

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

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<th>Code</th>
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<td>Efficient Energy Systems and Electric Mobility</td>
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<td>Jochem, McKenna</td>
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<tr>
<td>T-WIWI-102650</td>
<td>Energy and Environment</td>
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<td>Karl</td>
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<td>T-WIWI-102830</td>
<td>Energy Systems Analysis</td>
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<td>Ardone, Fichtner</td>
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<td>T-WIWI-107464</td>
<td>Smart Energy Infrastructure</td>
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<td>Ardone, Pustisek</td>
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<td>T-WIWI-102695</td>
<td>Heat Economy</td>
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Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

Competence Goal
The student

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

Prerequisites
None

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

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

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)

Economics and Management (Elective Modules in Business Administration)

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

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</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.
5.52 Module: Environmental Economics [M-WIWI-101468]

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

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

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

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>T-WIWI-102650</td>
<td>Energy and Environment</td>
<td>4.5</td>
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<tr>
<td>T-WIWI-100007</td>
<td>Transport Economics</td>
<td>4.5</td>
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<tr>
<td>T-WIWI-102615</td>
<td>Environmental Economics and Sustainability</td>
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<td>T-WIWI-102616</td>
<td>Environmental and Resource Policy</td>
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<tr>
<td>T-INFO-101348</td>
<td>Environmental Law</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 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 and Management (Elective Modules in Economics and Management)

**Credits:** 9

**Recurrence:** Each term

**Language:** German

**Level:** 4

**Version:** 5

### Election block: Compulsory Elective Courses (2 Items)

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<th>Credits</th>
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<tr>
<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>
</tr>
<tr>
<td>T-WIWI-102863</td>
<td>Topics in Experimental Economics</td>
<td>4.5 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

**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.
5.54 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:** Economics and Management (Elective Modules in Economics and Management)  
Economics and Management (Elective Modules in Business Administration)

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

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<td>4.5 CR</td>
<td>Uhrig-Homburg</td>
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<td>T-WIWI-102621</td>
<td>Valuation</td>
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<td>T-WIWI-102647</td>
<td>Asset Pricing</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.
5.55 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:**
- Economics and Management (Elective Modules in Economics and Management)
- Economics and Management (Elective Modules in Business Administration)

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

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<td>Asset Pricing</td>
<td>4,5 CR</td>
<td>Ruckes, Uhrig-Homburg</td>
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<td>T-WIWI-108880</td>
<td>Blockchains &amp; Cryptofinance</td>
<td>4,5 CR</td>
<td>Schuster, Uhrig-Homburg</td>
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<td>T-WIWI-109050</td>
<td>Corporate Risk Management</td>
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<td>T-WIWI-102643</td>
<td>Derivatives</td>
<td>4,5 CR</td>
<td>Uhrig-Homburg</td>
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<td>T-WIWI-110797</td>
<td>eFinance: Information Systems for Securities Trading</td>
<td>4,5 CR</td>
<td>Weinhardt</td>
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<td>T-WIWI-102644</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 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.
### 5.56 Module: Finance 3 [M-WIWI-101480]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management), Economics and Management (Elective Modules in Business Administration)

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

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<td>T-WIWI-102647</td>
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<td>Corporate Risk Management</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 assessment procedures are described for each course of the module seperately.

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

**Competence Goal**

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

**Prerequisites**

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

**Content**

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

**Workload**

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

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<tr>
<th>Responsible:</th>
<th>Prof. Dr Maxim Ulrich</th>
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| Part of:      | Economics and Management (Elective Modules in Economics and Management)  
Economics and Management (Elective Modules in Business Administration) |

| Mandatory | | |
|-----------|-----------------|
| T-WIWI-106193 | Engineering FinTech Solutions |

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

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

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

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

#### Recommendation
None

#### Workload
Total effort for 9 credit points: approx. 270 hours.
5.58 Module: Formal Systems [M-INFO-100799]

**Responsible:** Prof. Dr. Bernhard Beckert

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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### 5.59 Module: Formal Systems II: Application [M-INFO-100744]

**Responsible:** Prof. Dr. Bernhard Beckert  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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### 5.60 Module: Formal Systems II: Theory [M-INFO-100841]

**Responsible:** Prof. Dr. Bernhard Beckert  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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Module: Future Networking [M-INFO-101205]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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Election block: Future Networking (at least 1 item as well as at least 8 credits)

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<td>T-INFO-101322</td>
<td>Mobile Communication</td>
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<td>Waldhorst, Zitterbart</td>
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<td>T-INFO-101337</td>
<td>Internet of Everything</td>
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<td>T-INFO-101338</td>
<td>Telematics</td>
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Competence Goal
Each student should be able

- to learn and use the concepts and principals of future network design
- to identify the flaws and benefits of future communication systems
- to judge the performance of protocols, future networks and architectures
- master advanced protocols, architectures and algorithms of future communication systems

Content
This module details selected aspects of future communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.
5.62 Module: Geometric Optimization [M-INFO-100730]

**Responsible:** Prof. Dr. Hartmut Prautzsch

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

- **Credits:** 3
- **Recurrence:** Irregular
- **Duration:** 1 term
- **Language:** German
- **Level:** 4
- **Version:** 1

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<td>3 CR Prautzsch</td>
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## 5.63 Module: Governance, Risk & Compliance [M-INFO-101242]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** Law

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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>T-INFO-102047</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 and Management ( Elective Modules in Economics and Management)

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Election block: Compulsory Elective Courses (9 credits)

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<td>T-WIWI-102785</td>
<td>Theory of Endogenous Growth</td>
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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.
### 5.65 Module: Human Computer Interaction [M-INFO-100729]

**Responsible:** Prof. Dr.-Ing. Michael Beigl  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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<td>Human-Machine-Interaction Pass</td>
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### 5.66 Module: Human Factors in Security and Privacy [M-WIWI-104520]

**Responsible:** Prof. Dr. Melanie Volkamer  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Informatics

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<td>T-WIWI-109271</td>
<td>Advanced Lab User Studies in Security</td>
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<td>Volkamer</td>
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**Competence Certificate**

The module examination is carried out in the form of partial examinations on the selected courses of the module, with which the minimum requirement at creditpoints is fulfilled. The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

**Competence Goal**

Students...

- know why many existing security and privacy mechanisms are not usable and why many awareness/education/training approaches are not effective
- can explain for concrete examples why these are not usable / not effective including why people are likely to face problems with these
- can explain what mental models are, why they are important and how they can be identified
- know how to conduct a cognitive walkthrough to identify problems with existing mechanisms and approaches
- know how to conduct semi-structured interviews
- know how user studies in the security context differ from those conducted in other contexts
- can explain the process of human centered security / privacy by design
- know the advantages and disadvantages of various graphical password schemes
- know concepts such as just in time and place security interventions

**Prerequisites**

None
Content
The history of information security and privacy has taught us that it takes more than technological innovation to develop effective security and privacy mechanisms: Many aspects of information security and privacy actually depend on both technical and human factors. As a result of focusing on the technical factors, we are seeing a persistent gap between theoretical security and actual security in real world which becomes an increasing problem in the age of digitalization. The gap is mainly caused by strong and actually unrealistic assumptions regarding the users' knowledge and behavior.

Human factors in security and privacy research addresses several types of security and privacy mechanisms, e.g., authentication mechanisms including text and graphical passwords, security and privacy indicators (such as the icons in the address bar of nowadays web browsers) and security and privacy interventions like warning messages, permission dialogs and security and privacy policies as well as corresponding configuration interfaces. Besides security and privacy mechanisms, human factors in security and privacy researchers deal with security and privacy awareness, education, and training approaches.

'Human factors in security & privacy' research areas are:

- identifying users' mental models using techniques such as (semi-)structured interviews or focus groups,
- evaluating existing approaches regarding their effectiveness in supporting their users in making secure decisions/informed decisions in the context of privacy using techniques such as cognitive walkthroughs, lab user studies or even field studies,
- proposing improved/new approaches and evaluating their effectiveness using the so called human-centered security/privacy by design approach.

This module discusses the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study. The main focus of the lab will be to replicate a quantitative based user study.

Annotation
This new module can be chosen from winter term 2018/2019.

Workload
The total workload for this module is approximately 270 hours.
Module: Image Data Compression [M-INFO-100755]

Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: Informatics

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

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

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

**Part of:**
- Economics and Management (Elective Modules in Economics and Management)
- Economics and Management (Elective Modules in Business Administration)

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**Mandatory**

- **T-WIWI-102631** Planning and Management of Industrial Plants 5.5 CR Schultmann

**Election block: Supplementary Courses (at most 1 item)**

- **T-WIWI-102763** Supply Chain Management with Advanced Planning Systems 3.5 CR Bosch, Göbelt
- **T-WIWI-102826** Risk Management in Industrial Supply Networks 3.5 CR Schultmann, Wiens
- **T-WIWI-102828** Supply Chain Management in the Automotive Industry 3.5 CR Heupel, Lang
- **T-WIWI-103134** Project Management 3.5 CR Schultmann

**Election block: Supplementary Courses (at most 1 item)**

- **T-WIWI-102634** Emissions into the Environment 3.5 CR Karl
- **T-WIWI-102882** International Management in Engineering and Production 3.5 CR Sasse
- **T-WIWI-110512** Life Cycle Assessment 3.5 CR Schultmann

**Competence Certificate**

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

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

**Competence Goal**

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

**Prerequisites**

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

**Content**

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

**Annotation**

Apart from the core course the courses offered are recommendations and can be replaced by courses from the Module Industrial Production III.
Workload
Total effort will account to 270 hours (9 credit points) and can be allocated according to the credit point rating. Therefore, a course with 3.5 credits requires an effort of approximately 105h and a course with 5.5 credits 165h.

The total effort for each course consists of attending lectures and tutorials, examination times and the time an average student needs to prepare himself in order to pass the exam with an average grade.
Module: Industrial Production III [M-WIWI-101412]

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

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

**Part of:**
- Economics and Management (Elective Modules in Economics and Management)
- Economics and Management (Elective Modules in Business Administration)

### Credits
9

### Recurrence
Each summer term

### Duration
1 semester

### Language
German/English

### Level
4

### Version
2

### Mandatory

<table>
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<th>Credits</th>
<th>CR</th>
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<tbody>
<tr>
<td>T-WIWI-102632</td>
<td>Production and Logistics Management</td>
<td>5.5</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</td>
<td>Karl</td>
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<tr>
<td>T-WIWI-102882</td>
<td>International Management in Engineering and Production</td>
<td>3.5</td>
<td>Sasse</td>
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<td>T-WIWI-110512</td>
<td>Life Cycle Assessment</td>
<td>3.5</td>
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**Election block: Supplementary Courses (at most 1 item)**

<table>
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<th>Course Name</th>
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<tr>
<td>T-WIWI-102763</td>
<td>Supply Chain Management with Advanced Planning Systems</td>
<td>3.5</td>
<td>Bosch, Göbelt</td>
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<tr>
<td>T-WIWI-102826</td>
<td>Risk Management in Industrial Supply Networks</td>
<td>3.5</td>
<td>Schultmann, Wiens</td>
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<tr>
<td>T-WIWI-102828</td>
<td>Supply Chain Management in the Automotive Industry</td>
<td>3.5</td>
<td>Heupel, Lang</td>
</tr>
<tr>
<td>T-WIWI-103134</td>
<td>Project Management</td>
<td>3.5</td>
<td>Schultmann</td>
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</table>

### 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.
5.70 Module: Information Engineering and Management [M-WIWI-101443]

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

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

**Part of:** Economics and Management (mandatory)

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<td>T-WIWI-110373</td>
<td>Advanced Information Systems</td>
<td>5 CR</td>
</tr>
<tr>
<td>T-WIWI-102886</td>
<td>Business Administration in Information Engineering and Management</td>
<td>5 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 each course of this module, whose sum of credits 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,
- evaluates informations flows and the value of information in an interdisciplinary context,
- works out solutions in teams,
- transfers models from Business Administration to situations in business whose basic conditions are changed due to the implementation of information and communication technology,
- applies methods from Business Administration (Decision theory, game theory, operations research, etc.) to questions of Information Engineering and Management,
- analyzes the potential to automize the decision making process in businesses by data bases,
- describes the process to extract relevant data for decision making from operational accounting systems.

**Content**

The module Information Engineering and Management comprises the lectures Advanced Information Systems and Business Administration in Information Engineering and Management.

In the lecture Advanced 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 extraction/generation through storage transformation and evaluation until the marketing and usage of information are analyzed from the business administration perspective and the microeconomic perspective. The state of the art of economic theory is presented throughout the different phases of the information lifecycle. The lecture is complemented by accompanying exercise courses.

In the lecture Business Administration in Information Engineering and Management, classical Business Administration is applied to businesses in an information- and communication technological environment. The process to extract relevant data for decision making from operational accounting systems receives special attention. In order to do so, topics such as activity-based costing and transaction costs models are addressed. The automatization of the decision making process in businesses by data bases is another focus of the module. To solve such issues within a company, relevant methods such as decision theory and game theory are lectured. Finally, complex business relevant questions in a dynamically changing environment are adressed by presenting models and methods from system dynamics.
5.71 Module: Information Systems in Organizations [M-WIWI-104068]

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

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

**Part of:**
- Economics and Management (Elective Modules in Economics and Management)
- Economics and Management (Elective Modules in Business Administration)

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

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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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<td>T-WIWI-110851</td>
<td>Designing Interactive Systems</td>
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<td>Mädche, Morana</td>
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<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
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<td>Mädche</td>
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<td>T-WIWI-108437</td>
<td>Practical Seminar: Information Systems and Service Design</td>
<td>4.5 CR</td>
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**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.
5.72 Module: Innovation and Growth [M-WIWI-101478]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)

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<th>Level</th>
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**Election block: Compulsory Elective Courses (between 9 and 10 credits)**

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<td>T-WIWI-109194</td>
<td>Dynamic Macroeconomics</td>
<td>4.5</td>
<td>Brumm</td>
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<tr>
<td>T-WIWI-102785</td>
<td>Theory of Endogenous Growth</td>
<td>4.5</td>
<td>Ott</td>
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<tr>
<td>T-WIWI-102840</td>
<td>Innovation Theory and Policy</td>
<td>4.5</td>
<td>Ott</td>
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**Competence Certificate**

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

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

**Competence Goal**

Students shall be given the ability to

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

**Prerequisites**

None

**Content**

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

**Recommendation**

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

**Workload**

Total expenditure of time for 9 credits: 270 hours

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

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

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

<table>
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<th>Level</th>
<th>Version</th>
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<td>Each term</td>
<td>2 semester</td>
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Election block: Compulsory Elective Courses (between 9 and 10 credits)

<table>
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<th>Credits</th>
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<tbody>
<tr>
<td>T-WIWI-102840</td>
<td>Innovation Theory and Policy</td>
<td>4.5 CR</td>
<td>Ott</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>
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<tr>
<td>T-WIWI-109864</td>
<td>Product and Innovation Management</td>
<td>3 CR</td>
<td>Klarmann</td>
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<td>T-WIWI-102789</td>
<td>Seminar in Economic Policy</td>
<td>3 CR</td>
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Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

Competence Goal
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.
### 5.74 Module: Innovation Management [M-WIWI-101507]

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

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<th>Duration</th>
<th>Language</th>
<th>Level</th>
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<tbody>
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<td>Each term</td>
<td>1 semester</td>
<td>German/English</td>
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</table>

**Mandatory**

- T-WIWI-102893 [Innovation Management: Concepts, Strategies and Methods](#)  
  - 3 CR Weissenberger-Eibl

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

- T-WIWI-102873 [Current Issues in Innovation Management](#)  
  - 3 CR Weissenberger-Eibl
- T-WIWI-110867 [The negotiation of open innovation](#)  
  - 3 CR Beyer
- T-WIWI-108875 [Digital Transformation and Business Models](#)  
  - 3 CR Koch
- T-WIWI-102852 [Case Studies Seminar: Innovation Management](#)  
  - 3 CR Weissenberger-Eibl
- T-WIWI-108774 [Analyzing and Evaluating Innovation Processes](#)  
  - 3 CR Beyer
- T-WIWI-110234 [Innovation Processes Live](#)  
  - 3 CR Beyer
- T-WIWI-110263 [Methods in Innovation Management](#)  
  - 3 CR Koch
- T-WIWI-102853 [Roadmapping](#)  
  - 3 CR Koch
- T-WIWI-109932 [A Closer Look at Social Innovation](#)  
  - 3 CR Beyer
- T-WIWI-102858 [Technology Assessment](#)  
  - 3 CR Koch
- T-WIWI-102854 [Technologies for Innovation Management](#)  
  - 3 CR Koch

**Election block: Supplementary Courses (1 item)**

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

**Competence Certificate**

See German version.

**Competence Goal**

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

After completing the module, students should have developed a systemic understanding of the innovation process and be able to shape this by developing and applying suitable methods.
Prerequisites
The lecture “Innovation Management: Concepts, Strategies and Methods” and one of the seminars of the chair for Innovation and Technology Management are compulsory. The third course can be chosen from the courses of the module.

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

Recommendation
None

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Innovative Concepts of Data and Information Management [M-INFO-101208]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: Informatics

Credits 8
Recurrence Each term
Duration 1 semester
Level 4
Version 2

Election block: Innovative Concepts of Data and Information Management (at least 1 item as well as at least 8 credits)

<table>
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<th>Duration</th>
<th>Level</th>
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<td>Big Data Analytics</td>
<td>5 CR</td>
<td>Each term</td>
<td>1 semester</td>
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<td>2</td>
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<tr>
<td>T-INFO-101306</td>
<td>Datamanagement in the Cloud</td>
<td>5 CR</td>
<td>Each term</td>
<td>1 semester</td>
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<td>T-INFO-101317</td>
<td>Deployment of Database Systems</td>
<td>5 CR</td>
<td>Each term</td>
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<td>T-INFO-101975</td>
<td>Consulting in Practice</td>
<td>1.5 CR</td>
<td>Each term</td>
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<td>T-INFO-101976</td>
<td>Project Management in Practice</td>
<td>1.5 CR</td>
<td>Each term</td>
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<td>T-INFO-101977</td>
<td>Selling IT-Solutions Professionally</td>
<td>1.5 CR</td>
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<td>T-INFO-101257</td>
<td>Mechanisms and Applications of Workflow Systems</td>
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<tr>
<td>T-INFO-105742</td>
<td>Big Data Analytics 2</td>
<td>3 CR</td>
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<td>T-INFO-108377</td>
<td>Data Privacy: From Anonymization to Access Control</td>
<td>3 CR</td>
<td>Each term</td>
<td>1 semester</td>
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Competence Certificate
Siehe Teilleistung.

Competence Goal
The students

- know the research area of information systems in its various facets and are able to do scientific work in this area,
- are able to develop complex information systems on their own,
- are able to structure and manage complex projects in the field of information systems with unpredictable difficulties,
- are able to explain and to discuss complex aspects of the topics covered by this module with both experts and informed outsiders.

Prerequisites
None

Content
This module aims at exposing students to modern information management, both, in ‘breadth’ and ‘depth’. We achieve ‘breadth’ by means of a close inspection and comparison of different systems and their respective aims. We achieve ‘depth’ by means of an extensive examination of the underlying concepts and design alternatives, their assessment as well as by discussing applications.

Annotation
The courses of this module are offered irregularly. Nonetheless, it is guaranteed that the module can be passed anytime.
### Module: Intellectual Property Law [M-INFO-101215]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** Law

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

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<tr>
<td>T-INFO-102036</td>
<td>Computer Contract Law</td>
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<td>T-INFO-101308</td>
<td>Copyright</td>
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<td>T-INFO-101310</td>
<td>Patent Law</td>
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<td>T-INFO-101313</td>
<td>Trademark and Unfair Competition Law</td>
<td>3 CR</td>
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<td>T-INFO-101307</td>
<td>Internet Law</td>
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<td>T-INFO-108462</td>
<td>Selected Legal Issues of Internet Law</td>
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#### Prerequisites

None
Module: Intelligent Risk and Investment Advisory [M-WIWI-103247]

5.77 Module: Intelligent Risk and Investment Advisory [M-WIWI-103247]

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:** Economics and Management (Elective Modules in Business Administration)

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**T-WIWI-106442** Building Intelligent and Robo-Advised Portfolios 4,5 CR Ulrich

**T-WIWI-107032** Computational Risk and Asset Management I 9 CR Ulrich

**T-WIWI-106494** Computational Risk and Asset Management II 9 CR Ulrich

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

**Competence Certificate**

The module will be cancelled for the winter semester 2019/2020.

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

**Competence Goal**

Students obtain a practical and yet research oriented introduction into the field of quantitative and computational risk and investment management. Students learn how to use concepts from computer science, statistics, OR and economics to build intelligent risk and investment systems. Based on personal preferences, students can specialize within the module on either more practical programming and statistical learning points or more on the economic and mathematical insights and intuition.

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

**Prerequisites**

None.

**Content**

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

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

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

**Recommendation**

None

**Annotation**

See respective lecture
Workload
The total workload for this module is approximately 270 hours. For further information, see respective lecture.
5.78 Module: Intelligent Systems and Services [M-WIWI-101456]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: Informatics

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

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<td>T-WIWI-106423</td>
<td>Information Service Engineering</td>
<td>4.5 CR</td>
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<td>4.5 CR</td>
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Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Algorithms for Internet Applications [T-WIWI-102658]: The examination will be offered latest until summer term 2017 (repeaters only).

Competence Goal
Students

- know the different machine learning procedures for the supervised as well as the unsupervised learning,
- identify the pros and cons of the different learning methods,
- apply the discussed network learning methods in specific scenarios,
- compare the practicality of methods and algorithms with alternative approaches.

Prerequisites
None

Content
In the broader sense learning systems are understood as biological organisms and artificial systems which are able to change their behavior by processing outside influences. Network leaning methods based on symbolic, statistic and neuronal approaches are the focus of Computer Sciences.

In this module the most important network learning methods are introduced and their applicability is discussed with regard to different information sources such as data texts and images considering especially procedures for knowledge acquirement via data and text mining, natural analogue procedures as well as the application of organic learning procedures within the finance sector.

Annotation
Detailed information on the recognition of examinations in the field of Informatics can be found at http://www.aifb.kit.edu/web/Auslandsaufenthalt.
## 5.79 Module: Introduction to Video Analysis [M-INFO-100736]

**Responsible:** Prof. Dr.-Ing. Jürgen Beyerer  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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<th>Lab Course: Natural Language Processing and Software Engineering</th>
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# Module: Lab: Graph Visualization in Practice [M-INFO-103302]

**Responsible:** Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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<td>Lab: Graph Visualization in Practice</td>
<td>5 CR</td>
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## 5.82 Module: Laboratory Course Algorithm Engineering [M-INFO-102072]

**Responsible:** Prof. Dr. Peter Sanders  
Prof. Dr. Dorothea Wagner  

**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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<td>Laboratory Course Algorithm Engineering</td>
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</table>
## 5.83 Module: Language Technology and Compiler [M-INFO-100806]

**Responsible:** Prof. Dr.-Ing. Gregor Snelting  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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</table>
5.84 Module: Machine Learning [M-WIWI-103356]

**Responsible:** Prof. Dr.-Ing. Johann Marius Zöllner

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

**Part of:** Informatics

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

- T-WIWI-106340 Machine Learning 1 - Basic Methods 4.5 CR Zöllner
- T-WIWI-106341 Machine Learning 2 – Advanced Methods 4.5 CR Zöllner
- T-WIWI-109985 Project Lab Cognitive Automobiles and Robots 4.5 CR Zöllner
- T-WIWI-109983 Project Lab Machine Learning 4.5 CR Zöllner

**Competence Certificate**

The module examination is carried out in the form of partial examinations on the selected courses of the module, with which the minimum requirement at creditpoints is fulfilled. The learning control is described in each course. The overall score of the module is made up of the sub-scores weighted with creditpoints and is cut off after the first comma point.

**Competence Goal**

- Students gain knowledge of the basic methods in the field of machine learning.
- Students understand advanced concepts of machine learning and their application.
- 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 machine learning.

**Prerequisites**

None

**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 1" covers both 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 subsymbolic techniques such as neural networks, support vector machines, genetics Algorithms and reinforcement learning. The lecture introduces the basic principles as well as fundamental structures of learning systems and the learning theory and examines the previously developed algorithms. The design and operation of learning systems is presented and explained in some examples, especially in the fields of robotics, autonomous mobile systems and image processing.

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.).

**Workload**

The total workload for this module is approximately 270 hours.
5.85 Module: Machine Vision [M-INFO-101239]

**Responsible:** Prof. Dr.-Ing. Jürgen Beyerer

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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**Election block: Optional Courses (at least 1 item as well as at least 3 credits)**

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<td>T-INFO-101292</td>
<td>Image Data Compression</td>
<td>3 CR</td>
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<td>T-INFO-101363</td>
<td>Automated Visual Inspection and Image Processing</td>
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**Election block: Optional Courses (at least 1 item as well as at least 6 credits)**

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<td>Pattern Recognition</td>
<td>3 CR</td>
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<td>T-INFO-101347</td>
<td>Computer Vision for Human-Computer Interaction</td>
<td>6 CR</td>
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<td>T-INFO-101297</td>
<td>Biometric Systems for Person Identification</td>
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<td>Deep Learning for Computer Vision</td>
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Module: Management Accounting [M-WIWI-101498]

**Responsible:** Prof. Dr. Marcus Wouters

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)
Economics and Management (Elective Modules in Business Administration)

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<td>T-WIWI-102801</td>
<td>Management Accounting 2</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), 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.
5.87 Module: Market Engineering [M-WIWI-101446]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management) Economics and Management (Elective Modules in Business Administration)

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**Compentence 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.

**Compentence Goal**

The students

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

**Prerequisites**

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

**Content**

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

**Recommendation**

None

**Annotation**

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

**Workload**

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

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

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

**Part of:**
- Economics and Management (Elective Modules in Economics and Management)
- Economics and Management (Elective Modules in Business Administration)

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

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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>CR</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-106981</td>
<td>Digital Marketing and Sales in B2B</td>
<td>1.5 CR</td>
<td>Konhäuser</td>
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<tr>
<td>T-WIWI-102835</td>
<td>Marketing Strategy Business Game</td>
<td>1.5 CR</td>
<td>Klarmann</td>
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<tr>
<td>T-WIWI-102891</td>
<td>Price Negotiation and Sales Presentations</td>
<td>1.5 CR</td>
<td>Klarmann, Schröder</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.

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

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

**Prerequisites**
None

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

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

**Workload**
The total workload for this module is approximately 270 hours.
### 5.89 Module: Mathematical Programming [M-WIWI-101473]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Elective Modules in Economics and Management)

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**Election block: Compulsory Elective Courses (at most 2 Items)**

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<td>T-WIWI-102719</td>
<td>Mixed Integer Programming I</td>
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<td>T-WIWI-102726</td>
<td>Global Optimization I</td>
<td>4,5</td>
<td>CR Stein</td>
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<td>T-WIWI-103638</td>
<td>Global Optimization I and II</td>
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<td>T-WIWI-102856</td>
<td>Convex Analysis</td>
<td>4,5</td>
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<td>T-WIWI-102724</td>
<td>Nonlinear Optimization I</td>
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<td>CR Stein</td>
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<td>T-WIWI-103637</td>
<td>Nonlinear Optimization I and II</td>
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<td>Parametric Optimization</td>
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**Election block: Supplementary Courses (at most 2 Items)**

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<td>Mixed Integer Programming II</td>
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<td>CR Stein</td>
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<td>Global Optimization II</td>
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<td>CR Stein</td>
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<td>Graph Theory and Advanced Location Models</td>
<td>4,5</td>
<td>CR Nickel</td>
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<td>Large-scale Optimization</td>
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<td>CR Rebennack</td>
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<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</td>
<td>4,5</td>
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<td>Operations Research in Supply Chain Management</td>
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<td>T-WIWI-110162</td>
<td>Optimization Models and Applications</td>
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<td>CR Sudermann-Merx</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

- 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**

There is no compulsory course in the module.

**Content**

The module 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.
5.90 Module: Meshes and Point Clouds [M-INFO-100812]

**Responsible:** Prof. Dr. Hartmut Prautzsch

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

<table>
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Information Engineering and Management M.Sc.
Module Handbook as of 18.02.2020
5.91 Module: Microeconomic Theory [M-WIWI-101500]

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

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

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<tr>
<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory</td>
<td>4.5 CR</td>
<td>Mitusch</td>
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<tr>
<td>T-WIWI-102861</td>
<td>Advanced Game Theory</td>
<td>4.5 CR</td>
<td>Ehrhart, Puppe, Reiß</td>
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<td>T-WIWI-102859</td>
<td>Social Choice Theory</td>
<td>4.5 CR</td>
<td>Puppe</td>
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<td>T-WIWI-102613</td>
<td>Auction Theory</td>
<td>4.5 CR</td>
<td>Ehrhart</td>
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<td>T-WIWI-105781</td>
<td>Incentives in Organizations</td>
<td>4.5 CR</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal
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.
5.92 Module: Microservice-Based Web Applications [M-INFO-104061]

Responsible: Prof. Dr. Sebastian Abeck
Organisation: KIT Department of Informatics
Part of: Informatics

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<td>T-INFO-103121</td>
<td>Practical Course: Web Applications and Service-Oriented Architectures (II)</td>
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### 5.93 Module: Mobile Communication [M-INFO-100785]

**Responsible:** Prof. Dr. Oliver Waldhorst  
Prof. Dr. Martina Zitterbart  

**Organisation:** KIT Department of Informatics  
**Part of:** Informatics  

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<td>4 CR</td>
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</table>
5.94 Module: Models of Parallel Processing [M-INFO-100828]

| Responsible: | Thomas Worsch |
| Organisation: | KIT Department of Informatics |
| Part of: | Informatics |

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<tbody>
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<td>Models of Parallel Processing</td>
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</table>

Recommendation

Siehe Teilleistung
Module: Module Master Thesis [M-WIWI-101656]

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

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

**Part of:** Master Thesis

**Credits** 30  **Language** German  **Level** 4  **Version** 1

### Mandatory

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<td>30 CR</td>
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**Competence Certificate**
Examination by two examiners from the two faculties. For details refer to examination regulation. 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.

**Competence Goal**
The student can independently handle a complex and unfamiliar subject based on scientific criteria and 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 results and clearly communicate the results in scientific form.

**Prerequisites**
Regulated in §11 of the examination regulation.
The requirements for the examiner are described in §14 (2) of the examination regulation.
The master thesis shows that the candidate can autonomously investigate a problem from his discipline with scientific methods according to the state-of-the-art of the discipline within a specified time period.

• The master thesis can be written in German or English.

• The topic of a master thesis can be accepted or chosen by each of the examiners according to examination regulation. The examiner accepting a topic for a master thesis acts as the first supervisor of this thesis.

• Writing a master thesis with a supervisor who is not a member of the two faculties participating in the degree programme (Department of Informatics, Department of Economics and Management) requires acceptance by the examination board of the degree programme. The candidate must have an opportunity to make suggestions for the topic of the master thesis.

• Candidates can write a master thesis in teams. However, this requires that the contribution and performance of each candidate to the thesis is identifiable according to objective criteria which allow a unique delineation of each candidate's contribution. The contribution of each candidate regarded in isolation must fulfill the requirements a individual master thesis.

• In exceptional cases and upon request of the candidate, the chairman of the examination board chooses a supervisor and requests that this supervisor provides the candidate with a topic for the master thesis within 4 weeks after the request. In this case, the candidate is informed by the chairman of the examination board about the topic selected.

• Topic, specification of research tasks and the volume of the master thesis should be limited by the supervisor, so that the master thesis can be written with the assigned workload of 30 credits (750-900h).

• The master thesis must contain the following declaration of the candidate: “I truthfully assure that I have autonomously written this master thesis. I have quoted all sources used precisely and completely. I have labelled everything which has been taken from the work of others with or without change.” A master thesis without this declaration will not be accepted.

• The date of the assignment of the topic to a candidate as well as the date of delivery of the master thesis should be registered at the examination board. The candidate can return a topic for the master thesis only one time and only within a period of two month after he has received the topic. Upon a request of the candidate with reasons supporting an extension, the examination board may extend the deadline for the delivery of the master thesis by a maximum of three months. A master thesis not delivered within time is graded as “fail” except when the candidate is not responsible for this delay (e.g. protection of motherhood).

• Reviewing and grading should be done within 8 weeks after delivery of the master thesis.

Workload
The total workload for this module is approximately 900 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 and Management (Elective Modules in Economics and Management)

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

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<td>Competition in Networks</td>
<td>4.5</td>
<td>Mitusch</td>
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<td>T-WIWI-100007</td>
<td>Transport Economics</td>
<td>4.5</td>
<td>Mitusch, Szimba</td>
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<tr>
<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory</td>
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<td>Mitusch</td>
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<td>T-WIWI-102712</td>
<td>Regulation Theory and Practice</td>
<td>4.5</td>
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<td>Telecommunication and Internet Economics</td>
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**Competence Certificate**

The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**

The students

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

**Prerequisites**

None

**Content**

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

**Recommendation**

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

**Workload**

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

**Responsible:** Prof. Dr. Martina Zitterbart

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

<table>
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**Mandatory**

|---------------|-----------------------------------------------|------|------------|
5.98 Module: Networking [M-INFO-101206]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

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Election block: Networking (at least 1 item as well as at least 8 credits)

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<td>T-INFO-101321</td>
<td>Next Generation Internet</td>
<td>4 CR</td>
<td>Bless, Zitterbart</td>
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<td>T-INFO-104386</td>
<td>Practical Course Protocol Engineering</td>
<td>4 CR</td>
<td>Zitterbart</td>
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<td>T-INFO-101338</td>
<td>Telematics</td>
<td>6 CR</td>
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Competence Goal
Each student should be able

- to learn and use the concepts and principals of wired network design
- to identify the flaws and benefits of wired communication systems
- to judge the performance of protocols, wired networks and architectures
- master advanced protocols, architectures and algorithms of wired communication systems

Content
This module details selected aspects of wired communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.
### 5.99 Module: Networking Labs [M-INFO-101204]

**Responsible:** Prof. Dr. Hannes Hartenstein  
Prof. Dr. Martina Zitterbart

**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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**Election block: Networking Labs (at least 1 item as well as at least 9 credits)**

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**Competence Goal**

Each student should be able

- to learn and apply the concepts and principals of wireless network design
- to identify the flaws and benefits of wireless communication systems
- to judge the performance of protocols, wireless networks and architectures
- master advanced protocols, architectures and algorithms of wireless communication systems

**Content**

This module details and applies selected aspects of communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.
**5.100 Module: Networking Security - Theory and Praxis [M-INFO-101207]**

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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**Election block: Networking Security - Theory and Praxis (at least 1 item as well as at least 9 credits)**

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<td>T-INFO-101390</td>
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**Competence Goal**
Each student should be able

- to recall the basic security mechanisms and theoretical foundations of networking security and cryptography
- to read and understand actual academic papers
- to judge the security level of actual security solutions
- to identify possible attacks on security solutions

**Prerequisites**
None

**Content**
This module details selected aspects of networking security and cryptography in theory and praxis.

**Responsible:** Prof. Dr. Stefan Nickel

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)

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**Election block: Compulsory Elective Courses (at most 2 Items)**

| T-WIWI-102723 | Graph Theory and Advanced Location Models | 4.5 CR | Nickel |
| T-WIWI-106200 | Modeling and OR-Software: Advanced Topics | 4.5 CR | Nickel |
| T-WIWI-102715 | Operations Research in Supply Chain Management | 4.5 CR | Nickel |

**Election block: Supplementary Courses (at most 2 Items)**

| T-WIWI-106546 | Introduction to Stochastic Optimization | 4.5 CR | Rebennack |
| T-WIWI-102718 | Discrete-Event Simulation in Production and Logistics | 4.5 CR | Nickel |
| T-WIWI-102719 | Mixed Integer Programming I | 4.5 CR | Stein |
| T-WIWI-102720 | Mixed Integer Programming II | 4.5 CR | Stein |
| T-WIWI-110162 | Optimization Models and Applications | 4.5 CR | Sudermann-Merx |
| T-WIWI-106549 | Large-scale Optimization | 4.5 CR | Rebennack |

**Competence Certificate**

The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module 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**

There is no compulsory course in 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 assesses 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
**5.102 Module: Optimization under Uncertainty in Information Engineering and Management [M-WIWI-103243]**

**Responsible:** Prof. Dr. Steffen Rebennack  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (mandatory)

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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.

**Competence Goal**

The students are familiar with the modern concepts of stochastic modeling and are in a position to describe and to analyse simple systems in an adequate way.

**Prerequisites**

None

**Content**

Markov chains are no longer a nice theory but an important tool in order to model, analyse, and optimize a stochastic system as it evolves over time.  
Topics overview: Markov chains, Poisson Processes.

**Annotation**

New module starting summer term 2017.  
The planned lectures and courses for the next two years are announced online (http://www.ior.kit.edu/)

**Workload**

See German version.
### 5.103 Module: Parallel Algorithms [M-INFO-100796]

**Responsible:** Prof. Dr. Peter Sanders  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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### 5.104 Module: Pattern Recognition [M-INFO-100825]

**Responsible:** Prof. Dr.-Ing. Jürgen Beyerer  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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5.105 Module: Practical Course: Analysis of Complex Data Sets [M-INFO-102807]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

**Credits:** 4

**Recurrence:** Irregular

**Language:** English

**Level:** 4

**Version:** 1

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**Practical Course: Analysis of Complex Data Sets**

4 CR  Böhm
### 5.106 Module: Practical Course: Analyzing Big Data [M-INFO-101663]

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<td>T-INFO-103202</td>
<td>Analyzing Big Data - Laboratory Course</td>
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### Module: Practical Course: Database Systems [M-INFO-101662]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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Module: Practical Course: Geometric Modeling [M-INFO-101666]

**Responsible:** Prof. Dr. Hartmut Prautzsch

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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<p>| T-INFO-103207 | Practical Course: Geometric Modeling | 3 CR | Prautzsch |</p>
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### Module: Practical Course: Smart Data Analytics [M-INFO-103235]

**Responsible:** Prof. Dr.-Ing. Michael Beigl  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Law

Credits 9
Recurrence Each term
Language German
Level 4
Version 3

Election block: Private Business Law (at least 1 item as well as at least 9 credits)

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<td>T-INFO-101330</td>
<td>Employment Law II</td>
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<td>T-INFO-101315</td>
<td>Tax Law I</td>
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<td>T-INFO-101314</td>
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<td>T-INFO-101316</td>
<td>Law of Contracts</td>
<td>3 CR</td>
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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.
### 5.112 Module: Public Business Law [M-INFO-101217]

**Responsible:** Dr. Tristan Barczak  
**Organisation:** KIT Department of Informatics  
**Part of:** Law  

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**Election block: Public Business Law (at least 1 item as well as at least 9 credits)**

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<td>T-INFO-101309</td>
<td>Telecommunications Law</td>
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<td>T-INFO-101303</td>
<td>Data Protection Law</td>
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<td>T-INFO-101311</td>
<td>Public Media Law</td>
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<td>T-INFO-101312</td>
<td>European and International Law</td>
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<td>T-INFO-101348</td>
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**Competence Certificate**

see course description.
### 5.113 Module: Randomized Algorithms [M-INFO-100794]

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**Responsible:** Thomas Worsch  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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## 5.114 Module: Robotics I - Introduction to Robotics [M-INFO-100893]

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<tr>
<th>Responsible</th>
<th>Prof. Dr.-Ing. Tamim Asfour</th>
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**5.115 Module: Seminar Module Economic Sciences [M-WIWI-102736]**

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

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

**Part of:** Research Course

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

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<td>3 CR</td>
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**Competence Certificate**
The assessment is done by a seminar with at least 3 CP.
The assessment of the seminar (following §4(2), 3 ER) is described at the course description.

**Competence Goal**
- Students are able to independently deal with a defined problem in a specialized field based on scientific criteria.
- They are able to research, analyze the information, abstract and derive basic principles and regularities from unstructured information.
- They can solve the problems in a structured manner using their interdisciplinary know-how.
- They know how to validate the obtained results.
- Finally, they are able to logically and systematically present the results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

**Prerequisites**
None.

**Content**
The module consists of a seminar, that is related to the research field of economic sciences. A complete list of available seminars is published in the internet.

**Annotation**
The mentioned seminars in this module handbook are place holders. For each semester, a complete list of seminars are published in the Vorlesungsverzeichnis or at the web pages of the participating institutes. Often, the seminar topics for a given semester are published at the end of the preceding semester. Some seminars require an early sign-in deadline at the end of the of the preceding semester.

**Workload**
The total workload for this module is approximately 90 hours.
5.116 Module: Seminar Module Informatics [M-INFO-102822]

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

Part of: Research Course

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Election block: Compulsory Elective Seminar in Informatics (1 item)

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<td>T/INFO-104336</td>
<td>Seminar Informatics A</td>
<td>3 CR</td>
<td>Abeck</td>
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<tr>
<td>T/WIWI-103480</td>
<td>Seminar in Informatics B (Master)</td>
<td>3 CR</td>
<td>Professorenschaft des Fachbereichs Informatik</td>
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Module: Seminar Module Law [M-INFO-101218]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Research Course

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

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<td>T-INFO-101997</td>
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### Module: Seminar: Computer Science TECO [M-INFO-105328]

<table>
<thead>
<tr>
<th>Responsible</th>
<th>Prof. Dr.-Ing. Michael Beigl</th>
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### Mandatory

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5.119 Module: Service Analytics [M-WIWI-101506]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)  
Economics and Management (Elective Modules in Business Administration)

<table>
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**Election block: Compulsory Elective Courses (9 credits)**

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<td>T-WIWI-108715</td>
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<td>Satzger</td>
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<td>T-WIWI-105777</td>
<td>Business Intelligence Systems</td>
<td>4,5 CR</td>
<td>Mädche, Nadj, Toreini</td>
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<td>T-WIWI-102822</td>
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<td>T-WIWI-102899</td>
<td>Modeling and Analyzing Consumer Behavior with R</td>
<td>4,5 CR</td>
<td>Dorner, Weinhardt</td>
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<tr>
<td>T-WIWI-105778</td>
<td>Service Analytics A</td>
<td>4,5 CR</td>
<td>Fromm</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 core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**

Students

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

**Prerequisites**

None

**Content**

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

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

**Recommendation**

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

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
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:** Economics and Management (Elective Modules in Economics and Management)
  Economics and Management (Elective Modules in Business Administration)

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**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 project 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 bike 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 the 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.
5.121 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:** Economics and Management (Elective Modules in Economics and Management)  
Economics and Management (Elective Modules in Business Administration)

### Credits
- 9

### Recurrence
- Each term

### Language
- German

### Level
- 4

### Version
- 3

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

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<td>T-WIWI-110280</td>
<td>Digital Services: Business Models and Transformation</td>
<td>4.5 CR</td>
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<td>T-WIWI-106201</td>
<td>Digital Transformation of Organizations</td>
<td>4.5 CR</td>
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<td>T-WIWI-102640</td>
<td>Market Engineering: Information in Institutions</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 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.
5.122 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:** Economics and Management (Elective Modules in Economics and Management)  
Economics and Management (Elective Modules in Business Administration)

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

- **T-WIWI-105773** Digital Service Design  
  4.5 CR Mädche
- **T-WIWI-102639** Business Models in the Internet: Planning and Implementation  
  4.5 CR Weinhardt
- **T-WIWI-108437** Practical Seminar: Information Systems and Service Design  
  4.5 CR Mädche
- **T-WIWI-102799** Practical Seminar Service Innovation  
  4.5 CR Satzger
- **T-WIWI-102641** Service Innovation  
  4.5 CR Satzger

**Competence Certificate**

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

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

**Competence Goal**

Students

- know about the challenges, concepts, methods and tools of service innovation management and are able to use them successfully.
- have a profound comprehension of the development and design of innovative services and are able to apply suitable methods and tools on concrete and specific issues.
- are able to embed the concepts of innovation management, development and design of services into organisations
- are aware of the strategic importance of services, are able to present value creation in the context of services systems and to strategically exploit the possibilities of their digital transformation
- elaborate concrete and problem-solving solutions for practical tasks in teams.

**Prerequisites**

**Dependencies between courses:**

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

**Content**

This module is designed to constitute the basis for the development of successful ICT supported innovations thus including the methods and tools for innovation management, for the design and the development of digital services and the implementation of new business models. Current examples from science and practice enhance the relevance of the topics addressed.

**Recommendation**

Attending the course Practical Seminar Service Innovation [2595477] is recommended in combination with the course Service Innovation [2595468].

Attending the course Practical Seminar Digital Service Design [new] is recommended in combination with the course Digital Service Design [new].

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
5.123 Module: Service Management [M-WIWI-101448]

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

Organisation: KIT Department of Economics and Management

Part of: Economics and Management (Elective Modules in Economics and Management)  
Economics and Management (Elective Modules in Business Administration)

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

Mandatory

T-WIWI-110280  Digital Services: Business Models and Transformation  4.5 CR Satzger

Elective block: Supplementary Courses (4,5 credits)

T-WIWI-108715  Artificial Intelligence in Service Systems  4.5 CR Satzger
T-WIWI-106201  Digital Transformation of Organizations  4.5 CR Mädche
T-WIWI-102822  Industrial Services  4.5 CR Fromm
T-WIWI-102899  Modeling and Analyzing Consumer Behavior with R  4.5 CR Dorner, Weinhardt
T-WIWI-105778  Service Analytics A  4.5 CR Fromm
T-WIWI-102641  Service Innovation  4.5 CR Satzger

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

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

Competence Goal
The students

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- systematically use vast amounts of available data for planning, operation, personalization and improvement of complex service offerings, and
- understand and analyze innovation processes in corporations.

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

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

Recommendation
None

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
5.124 Module: Service Operations [M-WIWI-102805]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Elective Modules in Economics and Management)

<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 CR</td>
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<tr>
<td>T-WIWI-102884</td>
<td>Operations Research in Health Care Management</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-102715</td>
<td>Operations Research in Supply Chain Management</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-102716</td>
<td>Practical Seminar: Health Care Management (with Case Studies)</td>
<td>4,5 CR</td>
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**Election block: Supplementary Courses (at most 2 items)**

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<td>T-WIWI-102872</td>
<td>Challenges in Supply Chain Management</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

- 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**

There is no compulsory course in 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: Software Methods [M-INFO-101202]

Responsible: Prof. Dr. Ralf Reussner
Organisation: KIT Department of Informatics
Part of: Informatics

<table>
<thead>
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<th>Recurrence</th>
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<th>Version</th>
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<td>Each term</td>
<td>2 semester</td>
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Election block: Software Methods (at least 1 item as well as at least 9 credits)

<table>
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<tr>
<td>T-INFO-101381</td>
<td>Software Architecture and Quality</td>
<td>3 CR</td>
<td>Reussner</td>
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<tr>
<td>T-INFO-101256</td>
<td>Software-Evolution</td>
<td>3 CR</td>
<td>Reussner</td>
</tr>
<tr>
<td>T-INFO-101278</td>
<td>Model Driven Software Development</td>
<td>3 CR</td>
<td>Reussner</td>
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<tr>
<td>T-INFO-101300</td>
<td>Requirements Engineering</td>
<td>3 CR</td>
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</table>

Competence Goal
The students learn the foundations and advanced methods for systematic planning, design, implementation, evaluation and enhancement of software systems. By acquiring knowledge and capabilities to critically evaluate modern technologies, the students are enabled to use these technologies purposefully and effectively. Apart from functional viewpoints and software properties, extra-functional properties such as security and performance are taught. Additionally, an overview of current research topics and challenges are offered.

Prerequisites
None

Content
The content is explained in the course descriptions.
Module: Software Systems [M-INFO-101201]

**Responsible:** Prof. Dr. Ralf Reussner

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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

**Election block: Software Systems (at least 1 item as well as at least 9 credits)**

<table>
<thead>
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<th>Course Name</th>
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<th>Teacher</th>
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<tbody>
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<td>Software Architecture and Quality</td>
<td>3 CR</td>
<td>CR</td>
<td>Reussner</td>
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<td>T-INFO-101256</td>
<td>Software-Evolution</td>
<td>3 CR</td>
<td>CR</td>
<td>Reussner</td>
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<tr>
<td>T-INFO-101278</td>
<td>Model Driven Software Development</td>
<td>3 CR</td>
<td>CR</td>
<td>Reussner</td>
</tr>
<tr>
<td>T-INFO-101281</td>
<td>Formal Systems II: Application</td>
<td>5 CR</td>
<td>CR</td>
<td>Beckert</td>
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<td>T-INFO-101378</td>
<td>Formal Systems II: Theory</td>
<td>5 CR</td>
<td>CR</td>
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<tr>
<td>T-INFO-101300</td>
<td>Requirements Engineering</td>
<td>3 CR</td>
<td>CR</td>
<td>Koziolek</td>
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</table>

**Competence Goal**

In the courses that comprise this module, students learn different approaches and techniques for systematic and high-quality development of software systems, e.g. requirements engineering, implementing components and services, use of parallelism and multi-core platforms, as well as the verification of created software systems.

**Prerequisites**

None

**Content**

The content will be explained in the course descriptions.
Module: Stochastic Optimization [M-WIWI-103289]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Elective Modules in Economics and Management)

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

Election block: Compulsory Elective Courses (between 1 and 2 Items)

<table>
<thead>
<tr>
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<th>Recurrence</th>
<th>Language</th>
<th>Level</th>
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<tbody>
<tr>
<td>T-WIWI-106546</td>
<td>Introduction to Stochastic Optimization</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>German/English</td>
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<tr>
<td>T-WIWI-106548</td>
<td>Advanced Stochastic Optimization</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>German/English</td>
<td>4</td>
</tr>
<tr>
<td>T-WIWI-106549</td>
<td>Large-scale Optimization</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>German/English</td>
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Election block: Supplementary Courses (at most 1 item)

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<tr>
<th>Course Code</th>
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<th>Recurrence</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>Each term</td>
<td>German/English</td>
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<tr>
<td>T-WIWI-102719</td>
<td>Mixed Integer Programming I</td>
<td>4,5 CR</td>
<td>Each term</td>
<td>German/English</td>
<td>4</td>
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<tr>
<td>T-WIWI-102720</td>
<td>Mixed Integer Programming II</td>
<td>4,5 CR</td>
<td>Each term</td>
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<tr>
<td>T-WIWI-103124</td>
<td>Multivariate Statistical Methods</td>
<td>4,5 CR</td>
<td>Each term</td>
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<td>T-WIWI-102715</td>
<td>Operations Research in Supply Chain Management</td>
<td>4,5 CR</td>
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<td>T-WIWI-106545</td>
<td>Optimization under Uncertainty</td>
<td>4,5 CR</td>
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<td>T-WIWI-110162</td>
<td>Optimization Models and Applications</td>
<td>4,5 CR</td>
<td>Each term</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
There is no compulsory course in the module.

Content
The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

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

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

The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.
Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module’s learning objectives for an average student for an average performance.
5.128 Module: Subdivision Algorithms [M-INFO-101864]

**Responsible:** Prof. Dr. Hartmut Prautzsch

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

**Credits:** 5

**Recurrence:** Each summer term

**Language:** German

**Level:** 4

**Version:** 1

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**Mandatory**

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<td>Subdivision Algorithms</td>
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**Prerequisites**

None
## 5.129 Module: Telematics [M-INFO-100801]

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

<table>
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### Mandatory

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<th>6 CR</th>
<th>Zitterbart</th>
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</table>
5.130 Module: Theory and Practice of Data Warehousing and Mining [M-INF-101256]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

<table>
<thead>
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**Election block: Praktikum (at most 1 item as well as at most 4 credits)**

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<tbody>
<tr>
<td>T-INFO-103202</td>
<td>Analyzing Big Data - Laboratory Course</td>
<td>4 CR</td>
<td>Böhm</td>
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<tr>
<td>T-INFO-105796</td>
<td>Practical Course: Analysis of Complex Data Sets</td>
<td>4 CR</td>
<td>Böhm</td>
</tr>
<tr>
<td>T-INFO-106219</td>
<td>Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data</td>
<td>4 CR</td>
<td>Böhm</td>
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<tr>
<td>T-INFO-103201</td>
<td>Practical Course: Database Systems</td>
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**Election block: Vorlesung (at most 5 credits)**

<table>
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<th>Responsible</th>
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<tbody>
<tr>
<td>T-INFO-101305</td>
<td>Big Data Analytics</td>
<td>5 CR</td>
<td>Böhm</td>
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<tr>
<td>T-INFO-105742</td>
<td>Big Data Analytics 2</td>
<td>3 CR</td>
<td>Böhm</td>
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<tr>
<td>T-INFO-101317</td>
<td>Deployment of Database Systems</td>
<td>5 CR</td>
<td>Böhm</td>
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<tr>
<td>T-INFO-101306</td>
<td>Datamanagement in the Cloud</td>
<td>5 CR</td>
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<tr>
<td>T-INFO-108377</td>
<td>Data Privacy: From Anonymization to Access Control</td>
<td>3 CR</td>
<td>Böhm</td>
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</table>

**Competence Goal**

The students

- know the research area of information systems in its various facets and are able to do scientific work in this area,
- are able to explain and to discuss complex aspects of the topics covered by this module with both experts and informed outsiders,
- know the concepts, algorithms, techniques and selected tools in the areas of data warehousing and data mining,
- are familiar with the practical challenges of data analysis and are able to develop respective solutions on their own.

**Prerequisites**

None

**Content**

This module aims at exposing students to modern information management, both, in ‘breadth’ and ‘depth’. We achieve ‘breadth’ by means of a close inspection and comparison of different systems and their respective aims. We achieve ‘depth’ by means of an extensive examination of the underlying concepts and design alternatives, their assessment as well as by discussing applications. In particular, we look at data warehousing and mining techniques not only from a theoretical point of view but deploy and realise such technologies in a practical course.

**Annotation**

The courses of this module are offered irregularly. Nonetheless, it is guaranteed that the module can be passed anytime.
5.131 Module: Transport Infrastructure Policy and Regional Development [M-WIWI-101485]

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

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

**Part of:** Economics and Management (Elective Modules in Economics and Management)

<table>
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<th>Level</th>
<th>Version</th>
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<td>Each term</td>
<td>2 semester</td>
<td>German/English</td>
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**Election block: Compulsory Elective Courses (2 items)**

| T-WIWI-103107 | Spatial Economics | 4.5 CR | Ott |
| T-WIWI-100007 | Transport Economics | 4.5 CR | Mitusch, Szimba |

**Competence Certificate**

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

**Competence Goal**

The students

- understand the economic issues related to transport and regional development with a main focus on economic policy issues generated by the relationship of transport and regional development with the public sector
- are able to compare different considerations of politics, regulation and the private sector and to analyse and assess the respective decision problems both qualitatively and by applying appropriate methods from economic theory
- are prepared for careers in the public sector, particularly for public companies, politics, regulatory agencies, related consultancies, mayor construction companies or infrastructure project corporations

**Prerequisites**

None

**Content**

The development infrastructure (e.g. transport, energy, telecommunications) has always been one of the most relevant factors for economic development and particularly influences the development of the regional economy. From the repertoire of state actions, investments into transport infrastructure are often regarded the most important measure to foster regional economic growth. Besides the direct effects of transport policy on passenger and freight transport, a variety of individual economic activities is significantly dependent on the available or potential transport options. Decisions on the planning, financing and realization of mayor infrastructure projects require a solid and far-reaching consideration of direct and indirect growth effects with the occurring costs.

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

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
5.32 Module: Ubiquitous Computing [M-WIWI-101458]

Responsible: N.N.
Prof. Dr. Hartmut Schmeck

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
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<tr>
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**Mandatory**

<table>
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<tbody>
<tr>
<td>T-INFO-101326</td>
<td>Ubiquitous Computing</td>
<td>5 CR</td>
<td>Beigl</td>
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**Election block: Supplementary Courses (between 4 and 5 credits)**

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</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102761</td>
<td>Advanced Lab in Ubiquitous Computing</td>
<td>4 CR</td>
<td>Beigl, Schmeck</td>
</tr>
<tr>
<td>T-INFO-101323</td>
<td>IT-Security Management for Networked Systems</td>
<td>5 CR</td>
<td>Hartenstein</td>
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</table>

**Competence Certificate**

The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**

The student

- gets comprehensive knowledge about topics in the area of Ubiquitous Computing
- can design and evaluate ubiquitous systems in different application areas
- acquires appropriate knowledge for addressing specialized aspects in the area of ubiquitous computing

**Prerequisites**

See German version

**Content**

Ubiquitous information technology (Ubiquitous Computing) addresses the ubiquitous (or pervasive) availability of information processing. The availability of these systems has the objective to facilitate the operational environment in technical scenarios or in daily life of humans and to enrich it with new capabilities. This module provides fundamentals of ubiquitous computing and further topics like network and Internet technologies, security aspects, the analysis of autonomously operating systems in Organic Computing and also the utilisation of information and communication technologies in highly decentralized energy systems.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
## 5.133 Module: Ubiquitous Computing [M-INFO-100789]

**Responsible:** Prof. Dr.-Ing. Michael Beigl  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

<table>
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<th>Version</th>
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<td>5</td>
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<th>Ubiquitous Computing</th>
<th>5 CR</th>
<th>Beigl</th>
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</table>
5.134 Module: Wearable Robotic Technologies [M-INFO-103294]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Prof. Dr.-Ing. Michael Beigl

Organisation: KIT Department of Informatics

Part of: Informatics

Credits: 4
Recurrence: Each summer term
Language: German/English
Level: 4
Version: 2

Mandatory
T-INFO-106557 | Wearable Robotic Technologies | 4 CR | Asfour, Beigl

Competence Goal
The students have received fundamental knowledge about wearable robotic technologies and understand the requirements for the design, the interface to the human body and the control of wearable robots. They are able to describe methods for modelling the human neuromusculoskeletal system, the mechatronic design, fabrication and composition of interfaces to the human body. The students understand the symbiotic human–machine interaction as a core topic of Anthropomatics and have knowledge of state of the art examples of exoskeletons, orthoses and prostheses.

Content
The lecture starts with an overview of wearable robot technologies (exoskeletons, prostheses and orthoses) and its potentials, followed by the basics of wearable robotics. In addition to different approaches to the design of wearable robots and their related actuator and sensor technology, the lecture focuses on modeling the neuromusculoskeletal system of the human body and the physical and cognitive human-robot interaction for tightly coupled hybrid human-robot systems. Examples of current research and various applications of lower, upper and full body exoskeletons as well as prostheses are presented.
5 MODULES

5.135 Module: Web and Data Science [M-WIWI-105368]

Responsibility: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: Informatics

<table>
<thead>
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<th>Credits</th>
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<th>Version</th>
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<td>Each term</td>
<td>1 semester</td>
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Election block: Compulsory Elective Courses (at least 2 items)

<table>
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<tr>
<td>T-WIWI-102666</td>
<td>Knowledge Discovery</td>
<td>4.5 CR</td>
<td>Sure-Vetter</td>
</tr>
<tr>
<td>T-WIWI-103112</td>
<td>Web Science</td>
<td>4.5 CR</td>
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<tr>
<td>T-WIWI-110548</td>
<td>Advanced Lab Informatics (Master)</td>
<td>4.5 CR</td>
<td>Professorenschaft des Fachbereichs Informatik</td>
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</tbody>
</table>

Competence Certificate
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student
- know the basics of machine learning, data mining and knowledge discovery
- can design, train and evaluate systems that are capable of learning
- carry out knowledge discovery projects, taking into account algorithms, representations and applications.
- will look at current research topics in the field of Web Science and
- learn about the topics Small World Problem, Network Theory, Social Network Analysis, Bibliometrics, Link Analysis and Search,
- apply interdisciplinary thinking and
- apply technological approaches to social science problems.

Prerequisites
None

Content
The module focuses on machine learning and data mining methods for knowledge acquisition from large databases as well as web phenomena and the available technologies.

The lecture Knowledge Discovery 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.

The lecture “Web Science” offers an insight into the analysis of social networks and the metrics used in this context. Thereby especially web phenomena and the available technologies.

Web Science is the emerging study of the people and technologies, applications, processes and practices that make the world Wide Web and are shaped and emboressed. Web Science aims to develop theories, methods and findings from the entire academic disciplines and work with industry, business, politics and civil society to create an understanding of the Web: The largest socio-technical infrastructure in the history of mankind.

The lecture gives an introduction to the basic concepts of Web Science. Essential theoretical foundations, Phenomena and methods are presented and explained. This lecture aims to give students a basic knowledge and understanding of the structure and analysis of selected web phenomena and technologies. The topics include the small world problem, Network theory, social network analysis, graph-based search and technologies / standards / architectures.
Workload
The total workload for this module is approximately 270 hours.
Module: Web Data Management [M-WIWI-101455]

**Responsible:** Prof. Dr. York Sure-Vetter

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

**Part of:** Informatics

<table>
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**Election block: Compulsory Elective Courses (2 Items)**

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<td>T-WIWI-110848</td>
<td>Semantic Web Technologies</td>
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<td>Sure-Vetter</td>
</tr>
<tr>
<td>T-WIWI-103112</td>
<td>Web Science</td>
<td>4.5 CR</td>
<td>Sure-Vetter</td>
</tr>
<tr>
<td>T-WIWI-110548</td>
<td>Advanced Lab Informatics (Master)</td>
<td>4.5 CR</td>
<td>Professorenschaft des Fachbereichs Informatik</td>
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</table>

**Competence Certificate**

The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**

Students

- develop ontologies for semantic web technologies and choose suitable representation languages,
- are able to provide data and applications via a cloud-based infrastructure
- transfer the methods and technologies of semantic web technologies and cloud computing to new application sectors,
- evaluate the potential of semantic web technologies and the cloud computing approaches for new application sectors.

**Content**

The module Web Data Management covers the basic principles, methods and applications for intelligent systems in the World Wide Web. Cloud Services are essential for the decentralized, scalable provision of data and applications as well as the methods of semantic web based on the description of data and services via metadata in form of so called ontologies.

Formal principles and practical aspects such as knowledge modeling and available representation language tools for ontologies are covered in detail. Methods for the realization of intelligent systems within the World Wide Web are treated and applications as in Web 2.0 or Service Science are discussed and evaluated.

Furthermore the application of modern Cloud technologies for the use of software and hardware as a service via internet is introduced. Cloud technologies allow the efficient implementation of applications on distributed computer clusters and permit a high scalability as well as new business models in the internet.

**Workload**

The total workload for this module is approximately 270 hours (9 credits). The allocation is based on the credits of the courses of the module. The workload for courses with 4.5 credits is about 135 hours.

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.
5.137 Module: Wireless Networking [M-INFO-101203]

Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: Informatics

Credits 8  Recurrence Each term  Duration 1 semester  Level 4  Version 2

Election block: Wireless Networking (at least 1 item as well as at least 8 credits)

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<td>4 CR</td>
<td>Zitterbart</td>
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<td>T-INFO-101322</td>
<td>Mobile Communication</td>
<td>4 CR</td>
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<td>T-INFO-101326</td>
<td>Ubiquitous Computing</td>
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Competence Goal
Each student should be able

- to learn and use the concepts and principals of wireless network design
- to identify the flaws and benefits of wireless communication systems
- to judge the performance of protocols, wireless networks and architectures
- master advanced protocols, architectures and algorithms of wireless communication systems

Content
This module details selected aspects of wireless communication systems. This includes beside the requirements of secure and multimedia-based communication also the realization and controllability of large communication systems and networks. An important aspect is benchmarking and mastering the used algorithms, protocols and architectures. Also actual developments and applications are in the focus of this module.
6 Courses

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

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

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**Events**

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<tr>
<td>SS 2020</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Beyer</td>
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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**

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

**Notes**

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.

**Responsible:** Prof. Dr. Hannes Hartenstein

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101204 - Networking Labs
- M-INFO-101210 - Dynamic IT-Infrastructures
- M-INFO-102233 - Further Examinations

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<th>2 SWS</th>
<th>Lecture (V)</th>
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**Exams**

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<th>7500278</th>
<th>Access Control Systems: Foundations and Practice</th>
<th>Prüfung (PR)</th>
<th>Hartenstein</th>
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Below you will find excerpts from events related to this course:

**Access Control Systems: Foundations and Practice**

241111, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
Notes
An information security model defines access rights that express for a given system which subjects are allowed to perform which actions on which objects. A system is said to be secure with respect to a given information security model, if it enforces the corresponding access rights. Thus, access control modeling and access control systems represent the fundamental building blocks of secure services, be it on the Web or in the Internet of Everything.

In this master-level course, we thoroughly investigate the evolution of access control models (access control matrix, role-based access control, attribute access control) and describe usage control models as a unified framework for both access control and digital rights management. We analyze current access control systems and APIs from both, the developers and the end users perspective, including Identity-as-a-Service. We look at current research aspects of secure data outsourcing and sharing, blockchains, and vehicular systems. Finally, we also discuss the ethical dimension of access management. Students prepare for each session by studying previously announced literature that is then jointly discussed in the lecture.

Amount of Work
Lecture: 15 x 2h = 30h
Weekly lecture preparation and follow-up: 15 x 2 x 2h = 60h
Exam preparation: 30h
120h = 4 ECTS

Learning Objectives
Summary: the student is able to derive suitable access control models from scenario requirements and is able to specify concrete access control systems. The student is aware of the limits of access control models and systems with respect to their analyzability and performance and security characteristics. The student is able to identify the resulting tradeoffs. The student knows the state of the art with respect to current research endeavors in the field of access control.

The specific competences are as follows. The student...

... is able to analyze a specific instance of an access control system and identify roles that enable a role-based access control realization.

... is able to decide which concrete architectures and protocols are technically suited for realizing a given access control model.

... is able to design an access control system architecture adhering to the requirements of a concrete scenario.

... knows access control models derived from social graphs and is able to analyze the opportunities for deanonymization of persons through metrics from the literature.

... knows specific access control protocols employed by providers of modern cloud-based services.

... knows the challenges of access control in inter and intra-vehicle communication and is able to identify the fundamental access control problems in the domain.

... knows access control mechanisms for secure data outsourcing and is able to analyze and compare the performance and security guarantees of the different approaches.

... knows access control protocols to enable decentralized data sharing through cryptographic methods and is able to compare protocol realizations based on different cryptographic building blocks with respect to their performance.

... knows blockchain-based approaches to ensure the consistency in decentralized systems and is able to identify tradeoffs between consistency and anonymity.
6 Course: Advanced Empirical Asset Pricing [T-WIWI-110513]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

### Events

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<td>Practice (Ü)</td>
<td>1 SWS</td>
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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.

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

#### Advanced Empirical Asset Pricing

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

**Lecture (V)**

**Notes**

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.
6 COURSES

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

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

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

**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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**Exams**

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**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
Basic knowledge of mathematics and statistics is assumed.

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

**Advanced Game Theory**

2521533, WS 19/20, 2 SWS, Language: English, [Open in study portal](#)

**Learning Content**
This course offers an advanced and rigorous treatment of game theory.

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

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

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

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101443 - Information Engineering and Management

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Exams

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

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

Modeled Conditions

The following conditions have to be fulfilled:

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

Recommendation
None

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

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

Advanced Information Systems
2540450, WS 19/20, 2 SWS, Language: German/English, Open in study portal
Lecture (V)

Description
Information plays a central role in today’s society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the ‘information lifecycle’ that systematizes all phases from information generation to information distribution. The state of the art of economic theory is presented across this information lifecycle within the lectures. The content of the lecture is deepened in accompanying lecture courses.
Learning Content
Information plays a central role in today’s society. The resulting structures and processes cannot be explained intuitively with traditional approaches of economic theory. Formerly, information has only been implicitly treated as a production factor; its role as a competitive factor used to be neglected. In order to deal with the central role of information we developed the concept of the "information lifecycle" that systematizes all phases from information generation to information distribution. The single phases of that cycle,

- extraction/generation,
- storage,
- transformation,
- evaluation,
- marketing
- and usage of information

are analyzed from the business administration perspective and the microeconomic perspective. The state of the art of economic theory is presented across this information lifecycle within the lectures. The content of the lecture is deepened in accompanying lecture courses.

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

Literature
6.6 Course: Advanced Lab in Ubiquitous Computing [T-WIWI-102761]

**Responsible:** Prof. Dr.-Ing. Michael Beigl  
Prof. Dr. Hartmut Schmeck  

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101458 - Ubiquitous Computing  

**Type**  
Examination of another type  

**Credits**  
4  

**Recurrence**  
Irregular  

**Version**  
1  

**Competence Certificate**  
See German version  

**Prerequisites**  
None  

**Annotation**  
See German Version
6.7 Course: Advanced Lab Informatics (Master) [T-WIWI-110548]

**Responsible:** Professorenschaft des Fachbereichs Informatik

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

**Part of:**
- M-WIWI-101455 - Web Data Management
- M-WIWI-101456 - Intelligent Systems and Services
- M-WIWI-101457 - Semantic Technologies
- M-WIWI-101477 - Development of Business Information Systems
- M-WIWI-102827 - Service Computing
- M-WIWI-105366 - Artificial Intelligence
- M-WIWI-105368 - Web and Data Science

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<td>WS 19/20 7900187 Real-World Challenges in Data Science und Analytics</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:

V
**Linked Data and the Semantic Web**
2512301, WS 19/20, 3 SWS, Language: German/English, [Open in study portal](#)

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

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

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

Topics of interest include, but are not limited to:

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

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

V
**Project lab Cognitive automobiles and robots**
2512501, WS 19/20, 3 SWS, Language: German/English, [Open in study portal](#)

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

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

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

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

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

Notes
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.

Notes
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.
Notes
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.

**Responsible:** Prof. Dr. Melanie Volkamer

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

**Part of:** M-WIWI-104520 - Human Factors in Security and Privacy

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<td>Each summer term</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
6.9 Course: Advanced Machine Learning [T-WIWI-109921]

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

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

**Part of:** M-WIWI-101470 - Data Science: Advanced CRM

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**Exams**

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<td>Prüfung (PR)</td>
<td>Geyer-Schulz</td>
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**Competence Certificate**

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**

None

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

**Advanced Machine Learning**

2540535, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
Notes
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.
6.10 Course: Advanced Management Accounting [T-WIWI-102885]

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

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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
2579907, WS 19/20, 4 SWS, Language: English, Open in study portal
Notes
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.

Learning Content
The course addresses several topics where management accounting is strongly related to marketing, finance, or organization and strategy, such as customer value propositions, financial performance measures, managing new product development, and technology investment decisions.

Annotation
This course is held in English. Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

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

Literature
Literature is mostly made available via ILIAS.
6.11 Course: Advanced Management Accounting 2 [T-WIWI-110179]

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

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Competence Certificate
The assessment consists of an oral exam (30 min) (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None.

Recommendation
The course requires significant prior knowledge of Management Accounting, similar to the content of the courses MA 1 and 2, although completion of these particular courses is not a formal requirement.

Annotation
This course is held in English. Lectures and tutorials are integrated.
Students who are interested in attending this course should send an e-mail to Professor Wouters (marc.wouters@kit.edu).

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

Advanced Management Accounting 2
2579908, SS 2020, 4 SWS, Language: English, Open in study portal

Learning Content
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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<td>WS 19/20</td>
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<td>Statistik für Fortgeschrittene</td>
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<td>Lecture (V)</td>
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<td>WS 19/20</td>
<td>2550553</td>
<td>Übung zu Statistik für Fortgeschrittene</td>
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**Exams**

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**Competence Certificate**

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

**Prerequisites**

None

**Annotation**

New course starting winter term 2015/2016

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

**Statistik für Fortgeschrittene**

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<tr>
<td>2550552</td>
<td>2 SWS</td>
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**Learning Content**

Basic principles
Types of convergence and limit theorems
Multivariate Distributions
Copulas
Simulation techniques, Bootstrap
Statistical Estimation
Statistical Testing
Simulation studies

**Literature**

Comprehensive lecture notes
6.13 Course: Advanced Stochastic Optimization [T-WIWI-106548]

**Responsible:** Prof. Dr. Steffen Rebennack

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-103289 - Stochastic Optimization

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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: 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-101500 - Microeconomic Theory
- M-WIWI-101502 - Economic Theory and its Application in Finance

### Events

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**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.

*Bellow 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]

**Learning Content**
The course deals with basic elements of modern economic theory. It is divided into two parts. The first part introduces the microeconomic foundations of general equilibrium à la Debreu ("The Theory of Value", 1959) and Hildenbrand/Kirman ("Equilibrium Analysis", 1988). The second part deals with asymmetric information and introduces the basic techniques of contract theory.

The course is largely based on the textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

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

**Literature**
The course is based on the excellent textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.
6.15 Course: Algorithm Engineering [T-INFO-101332]

**Responsible:** Prof. Dr. Peter Sanders  
Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:**  
M-INFO-100795 - Algorithm Engineering  
M-INFO-101199 - Advanced Algorithms: Design and Analysis  
M-INFO-101200 - Advanced Algorithms: Engineering and Applications  
M-INFO-102233 - Further Examinations

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<th>2/1 SWS</th>
<th>Lecture (V)</th>
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6.16 Course: Algorithmic Methods for Hard Optimization Problems [T-INFO-103334]

**Responsible:** Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101199 - Advanced Algorithms: Design and Analysis
- M-INFO-101200 - Advanced Algorithms: Engineering and Applications
- M-INFO-101237 - Algorithmic Methods for Hard Optimization Problems
- M-INFO-102233 - Further Examinations

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### 6.17 Course: Algorithmic Methods for Network Analysis [T-INFO-104759]

**Responsible:** Dr. rer. nat. Torsten Ueckerdt  
Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-102400 - Algorithmic Methods for Network Analysis

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

**Algorithmic Methods for Network Analysis**  
2400018, SS 2020, 2+1 SWS, Language: German, [Open in study portal](#)

**Notes**

150 h

**Literature**


### 6.18 Course: Algorithms for Routing [T-INFO-100002]

**Responsible:** Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-100031 - Algorithms for Routing  
- M-INFO-101199 - Advanced Algorithms: Design and Analysis  
- M-INFO-101200 - Advanced Algorithms: Engineering and Applications  
- M-INFO-102233 - Further Examinations

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**Events**

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<th>Algorithmen für Routenplanung (mit Übungen)</th>
<th>3 SWS</th>
<th>Lecture / Practice (VU)</th>
<th>Buchhold, Zeitz, Zündorf, Sauer, Ueckerdt</th>
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### 6.19 Course: Algorithms for Visualization of Graphs [T-INFO-104390]

**Responsible:** Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101199 - Advanced Algorithms: Design and Analysis
- M-INFO-101200 - Advanced Algorithms: Engineering and Applications
- M-INFO-102094 - Algorithms for Visualization of Graphs
- M-INFO-102233 - Further Examinations

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<td>2+1 SWS (VÜ)</td>
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**Exams**

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6.20 Course: Algorithms II [T-INFO-102020]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
Prof. Dr. Peter Sanders  
Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:**  
M-INFO-101173 - Algorithms II  
M-INFO-102233 - Further Examinations

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6.21 Course: Algorithms in Cellular Automata [T-INFO-101334]

**Responsible:** Thomas Worsch

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100797 - Algorithms in Cellular Automata
- M-INFO-101199 - Advanced Algorithms: Design and Analysis
- M-INFO-102233 - Further Examinations

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

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<th>Dr. Daniela Beyer</th>
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**Competence Certificate**
Non exam assessment (following §4(2) 3 of the examination regulation).

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

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management is recommended.
6.23 Course: Analyzing Big Data - Laboratory Course [T-INFO-103202]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101256 - Theory and Practice of Data Warehousing and Mining
- M-INFO-101663 - Practical Course: Analyzing Big Data
- M-INFO-102233 - Further Examinations

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Information Engineering and Management M.Sc.
Module Handbook as of 18.02.2020
6.24 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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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.
6.25 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

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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 19/20, 2 SWS, Language: English, [Open in study portal](#)  
Lecture (V)

**Learning Content**

Artificial Intelligence and the application of machine learning is becoming more and more popular to solve relevant business challenges. However, it is not only important to be familiar with precise algorithms, but rather a general understanding of the necessary steps with a holistic view—from real-world challenge to successful deployment of an AI. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. We then take this knowledge to the more complex case of service systems with different entities (e.g. companies) who interact with each other and show possibilities on how to derive holistic insights. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.
**6.26 Course: Asset Pricing [T-WIWI-102647]**

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

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

**Part of:**  
M-WIWI-101480 - Finance 3  
M-WIWI-101482 - Finance 1  
M-WIWI-101483 - Finance 2  
M-WIWI-101502 - Economic Theory and its Application in Finance

**Type**  
Written examination

**Credits**  
4.5

**Recurrence**  
Each summer term

**Version**  
2

**Events**

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**Exams**

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<tr>
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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](#)

**Description**

The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

**Learning Content**

This lecture deals with the valuation of risky cash flows. A stochastic discount model and a central equation will be introduced, which form the basis of nearly every valuation model in finance. That includes the valuation of stocks, bonds and derivatives. The first part of the lecture will present the theory, the second part covers empirical questions related to this approach.

**Workload**

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

Basic literature


Elective literature

6.27 Course: Asymmetric Encryption Schemes [T-INFO-101260]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-101198 - Advanced Topics in Cryptography
M-INFO-102233 - Further Examinations

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</table>

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

Asymmetric Encryption Schemes
24115, WS 19/20, 2 SWS, Language: German, Open in study portal

Notes

This course presents the theoretical and practical aspects of Public Key Cryptography.

- The most important primitives of cryptography will be covered, as there are: one-way function, hash function, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (e.g. Diffie-Hellman) with their strengths and weaknesses.
- In addition to public-key systems, the lecture provides knowledge about algorithms to solve number-theoretic problems on which the security of the systems is based. Thus the choice of parameters and the related level of security of a cryptographic system can be estimated.
- Furthermore, an introduction to provable security is provided, which presents some of the key security concepts (e.g. IND-CCA).
- The combination of cryptographic primitives will be treated on currently used protocols.

Learning Content

This course presents the theoretical and practical aspects of Public Key Cryptography.

- The most important primitives of cryptography will be covered, as there are: one-way function, hash function, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (e.g. Diffie-Hellman) with their strengths and weaknesses.
- In addition to public-key systems, the lecture provides knowledge about algorithms to solve number-theoretic problems on which the security of the systems is based. Thus the choice of parameters and the related level of security of a cryptographic system can be estimated.
- Furthermore, an introduction to provable security is provided, which presents some of the key security concepts (e.g. IND-CCA).
- The combination of cryptographic primitives will be treated on currently used protocols.
6.28 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 19/20, 2 SWS, Open in study portal

Learning Content
This course deals with the analysis and modeling of auction which are based on game theory. This also includes aspects of applying and designing auctions as well as experiences with auctions. Main topics are:

- Single- and multi-unit auctions
- Selling and procurement auctions
- Electronic auctions (e.g. eBay, C2C, B2B)
- Multi-attributive auctions.

Annotation
We suggest to attend either Game Theory I or Decision Theory beforehand.

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

Literature
- Ehrhart, K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999
### 6.29 Course: Automated Planning and Scheduling [T-INFO-109085]

**Responsible:** Prof. Dr. Peter Sanders  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-104447 - Automated Planning and Scheduling

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Responsible: Prof. Dr.-Ing. Jürgen Beyerer
Organisation: KIT Department of Informatics
Part of: M-INFO-100826 - Automated Visual Inspection and Image Processing
M-INFO-101238 - Automated Visual Inspection
M-INFO-101239 - Machine Vision
M-INFO-101241 - Image-based Detection and Classification
M-INFO-102233 - Further Examinations

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

Automated Visual Inspection and Image Processing

V

24169, WS 19/20, 4 SWS, Language: German, Open in study portal

Lecture (V)

Description

Topics covered:

- sensors and concepts for image acquisition
- light and colour
- image signals (system theory, Fourier transformation, stochastic processes)
- excursion to wave optics
- pre-processing and image enhancement
- image restoration
- segmentation
- morphological image processing
- texture analysis
- detection
- image pyramids, multi scale analysis and wavelet-transform

Learning Content

- sensors and concepts for image acquisition
- light and colour
- image signals (system theory, Fourier transformation, stochastic processes)
- excursion to wave optics
- pre-processing and image enhancement
- image restoration
- segmentation
- morphological image processing
- texture analysis
- detection
- image pyramids, multi scale analysis and wavelet-transform
6.31 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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**Exams**

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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:*

**Basic of German Company Tax Law and Tax Planning**

2560134, WS 19/20, 3 SWS, Language: German, Open in study portal

**Notes**

**Workload:**

The total workload for this course is approximately 135.0 hours. For further information see German version.
### Course: Big Data Analytics [T-INFO-101305]

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#### Events

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</table>
### 6.33 Course: Big Data Analytics 2 [T-INFO-105742]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101208 - Innovative Concepts of Data and Information Management  
- M-INFO-101256 - Theory and Practice of Data Warehousing and Mining  
- M-INFO-102233 - Further Examinations  
- M-INFO-102773 - Big Data Analytics 2

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**Prerequisites**

none
### 6.34 Course: Biologically Inspired Robots [T-INFO-101351]

**Responsible:** Prof. Dr.-Ing. Rüdiger Dillmann  
Arne Rönnau

**Organisation:** KIT Department of Informatics

**Part of:**  
M-INFO-101251 - Autonomous Robotics  
M-INFO-102233 - Further Examinations

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6.35 Course: Biometric Systems for Person Identification [T-INFO-101297]

**Responsible:** Prof. Dr.-Ing. Rainer Stiefelhagen

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101239 - Machine Vision
- M-INFO-102233 - Further Examinations

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

**Biometric Systems for Person Identification**

2403011, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Description**

Biometrics deals with the science of recognizing and identifying humans based on their biometrics traits, such as finger prints, face, iris, gait etc. With the increasing demands put on security and surveillance e.g. safer access control, border control/passports and identifying criminals /law enforcement, biometrics becomes more and more essential and technologies are being developed to solve many issues in this demanding area of research. In this course, the students will learn the fundamental concepts of underlying biometrics technologies, understanding of various techniques for different topics/technologies used in biometrics.

The topics include:
- Introduction: Biometrics acquisitions and image processing, basic introduction to the area of computer vision/machine learning applied to biometrics
- Biometrics system: requirements, enrollment, identification/verification, performance metrics
- Biometrics technologies: Overview of different biometrics technologies
- Finger print recognition: image enhancement, state-of-the art techniques, challenges
- Iris recognition: image acquisitions, feature extraction, state-of-the-art techniques, challenges
- Face recognition: introduction, current methods, applications
- Palm print recognition: current methods
- Gait recognition: emerging methods
- Multi-Biometrics: multiple modes of biometrics, fusion strategies
- Risk analysis: attacks, liveness detection, fraud prevention
Notes
Biometrics deals with the science of recognizing and identifying humans based on their biometrics traits, such as finger prints, face, iris, gait etc. With the increasing demands put on security and surveillance e.g. safer access control, border control/passports and identifying criminals/law enforcement, biometrics becomes more and more essential and technologies are being developed to solve many issues in this demanding area of research. In this course, the students will learn the fundamental concepts of underlying biometrics technologies, understanding of various techniques for different topics/technologies used in biometrics.

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- Biometrics technologies: Overview of different biometrics technologies
- Finger print recognition: image enhancement, state-of-the art techniques, challenges
- Iris recognition: image acquisitions, feature extraction, state-of-the-art techniques, challenges
- Face recognition: introduction, current methods, applications
- Palm print recognition: current methods
- Gait recognition: emerging methods
- Multi-Biometrics: multiple modes of biometrics, fusion strategies
- Risk analysis: attacks, liveness detection, fraud prevention

Learning Content
The student will acquire the basic theoretical and practical understanding of various technologies used in biometrics, the state-of-the-art algorithms used and their analysis. Student will be able to take advance courses in the field of computer vision/pattern recognition on the completion of this course.

Literature
- Tutorials and related scientific papers will be put on the web
- Online material on the topics discussed in the lectures
6.36 Course: Blockchains & Cryptofinance [T-WIWI-108880]

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

Organisation: KIT Department of Economics and Management  

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

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Exams  

| WS 19/20 | 7900028| Blockchains & Cryptofinance | Prüfung (PR) | Uhrig-Homburg |

Competition Certificate  
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations). A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites  
None

Recommendation  
None

Annotation  
**6.37 Course: Building Intelligent and Robo-Advised Portfolios [T-WIWI-106442]**

**Responsible:** Prof. Dr Maxim Ulrich  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103247 - Intelligent Risk and Investment Advisory

---

**Type**  
Written examination  
**Credits**  
9  
**Recurrence**  
Each summer term  
**Version**  
1

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**Competence Certificate**  
The exam will be cancelled for the winter semester 2019/2020.  
The exam tests the material of the current semester and takes place during the lecture-free period. Students who don’t pass the exam are allowed to re-take the exam.  
Details of the grade formation will be announced at the beginning of the event.

**Prerequisites**  
None.

**Recommendation**  
Good skills in applied math modeling (differential equations).

**Annotation**  
The course is not offered regularly.
6.38 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  
- M-WIWI-101443 - Information Engineering and Management

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**Competence Certificate**

The lecture is no longer offered.

**Prerequisites**

None

**Recommendation**

Basic knowledge from Operations Research (linear programming) and from decision theory are expected.
6.39 Course: Business Data Analytics: Application and Tools [T-WIWI-109863]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-103118 - Data Science: Data-Driven User Modeling

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<td>1 SWS</td>
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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

Description
The ongoing digitalization and digitization of businesses, industries and societies is generating vast amounts of data. Hence, researchers and businesses are facing increasing pressure to build capabilities to cope with the data and generate value from the contained but yet to be discovered knowledge, insights and information. Researchers and practitioners tackling this task are referred to as data scientists and need skills at the intersection of programming, statistics and development operations. This course provides a hands-on perspective on these fields.

Learning Content
The aim of this course is to introduce practical foundations, concepts, tools and current practice of Analytics from a data scientist’s perspective. The lecture is complemented with an Analytics challenge that is based on real-world data from research projects. The students immediately apply their newly acquired knowledge and learn to use a range of open source tools to solve the challenge.

Content:
- Conceptual and theoretical Foundations
- Programming languages common in data science
- Data acquisition, pre-processing
- Basics of data organization and DevOps
- Tool chain selection and automation
- Open source analytics frameworks and data processing infrastructures
- Applied analytics challenge (based on a current research project or a cooperation with an industry partner)

Workload
The total workload for this course is approximately 135 hours.
Course: Business Data Strategy [T-WIWI-106187]

**T 6.40 Course: Business Data Strategy [T-WIWI-106187]**

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103117 - Data Science: Data-Driven Information Systems

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**Competence Certificate**

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and an alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. The grade is determined by 2/3 through the written exam and by 1/3 through the alternative exam assessment (e.g., presentation).

**Prerequisites**

None

**Recommendation**

Students should be familiar with basic concepts of business organisations, information systems, and programming. However, all material will be introduced, so no formal pre-conditions are applied.

**Annotation**

Limited number of participants.

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

**Business Data Strategy**  
2540484, WS 19/20, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Notes**

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.

**Learning Content**

With new methods for capturing and using different types of data and industry’s recognition that society’s use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making 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.
Literature

- Fleckenstein & Fellows (2017) – Modern Data Strategy
- Leimeister (2015) – Einführung in die Wirtschaftsinformatik
- Urbach & Ahlemann (2016) – IT-Management im Zeitalter der Digitalisierung
6.41 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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**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 19/20, 2 SWS, Language: German, Open in study portal

**Learning Content**

Corporate growth, the diffusion of new technologies, business processes, project management, product development, service quality management – all these are examples for application areas of business dynamics. They all are dynamic systems that are characterized by feedback loops between many different variables. By means of the tools of business dynamics such systems can be modelled. Simulations of complex systems allow the analysis, the goal centered design, as well as the optimization of markets, business processes, policies, and organizations.

**Annotation**

The course is generally held as block course.
Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance
- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
6.42 Course: Business Intelligence Systems [T-WIWI-105777]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101506 - Service Analytics
M-WIWI-101510 - Cross-Functional Management Accounting
M-WIWI-103117 - Data Science: Data-Driven Information Systems
M-WIWI-104068 - Information Systems in Organizations

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Competence Certificate

Assessment consists of a written exam of 1 hour length and by submitting written papers as part of the exercise. 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 19/20, 3 SWS, Language: English, Open in study portal Lecture (V)

Description

In most modern enterprises, Business Intelligence Systems represent a core enabler of managerial decision making in that they are supplying up-to-date and accurate information about all relevant aspects of a company’s planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance.

The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of Business Intelligence Systems from a managerial and technical perspective. The lecture is complemented with a Business Intelligence System challenge, where students work with real-world data and enable system-based decision making using commercial Business Intelligence software packages.

Learning Content

- Conceptual Foundations
- Provisioning: ETL Process, Metadata, Data Warehouse & Data Marts and Big Data Technologies
- Consumption: Reporting, Dashboards and its relation to (Big Data) Analytics
- BI Strategy & Governance
- BI Implementation & Post-Implementation Management
- Business Intelligence System Challenge (in cooperation with industry partner)
Literature
Economist Intelligence Unit. 2015”Big data evolution: Forging new corporate capabilities for the long term”
6.43 Course: Business Models in the Internet: Planning and Implementation [T-WIWI-102639]

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

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

**Part of:**
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-102806 - Service Innovation, Design & Engineering

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**Events**

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<td>2540456</td>
<td>Internet Business Models</td>
<td>Lecture (V)</td>
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<td>SS 2020</td>
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<td>Übungen zu Geschäftsmodelle im Internet: Planung und Umsetzung</td>
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**Exams**

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**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]

**Description**

The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.
Learning Content
The emergence of internet economy has resulted in an accelerated evolution of commerce models in eBusiness. Early adopters have experimented with a variety of new business models, technologies and application designs. At the same time, there has been a growing demand for new standards to facilitate the exchange of information, catalogue content and transactions between buyers and sellers. But the true understanding of how to bring buyers and sellers together is still widely missing, leading to multiple cases of costly missed investments. This course focuses on the design and implementation of successful business models for eBusiness applications for the World Wide Web (WWW), imparting the basic knowledge for building successful eBusiness applications. We consider not only technical foundations of eBusiness applications but also economical aspects. In small groups, students develop and implement an eBusiness model that is eventually discussed with a representative from the venture capitalist industry.

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

Literature
Will be announced within the course.
6.44 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>
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**Exams**

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</table>

**Competence Certificate**

Alternative exam assessment.

**Prerequisites**

None

**Recommendation**

None

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

**V Business Planning for Founders (ENTECH)**

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

**Notes**

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

**V Business Planning for Founders**

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

**Notes**

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

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

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

**Part of:**
- M-WIWI-101487 - Sales Management
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101488 - Entrepreneurship (EnTechnon)

**Type:** Examination of another type

**Credits:** 3

**Recurrence:** Irregular

**Version:** 1

### Events

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### Exams

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<td>Terzidis</td>
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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. The combination can be credited either in the Entrepreneurship module or in the Sales Management module.

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

**Business Planning for Founders (EUCOR Edition)**

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

Organizational Information:

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

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

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

Course Dates and Locations:

- Business Planning for Founders:
  Wednesday, January 22, 2020, 1 pm - 6 pm
  Thursday, January 23, 2020, 9 am - 1 pm
  20.21, Raum 115

- International Selling:
  Thursday, January 23, 2020, 2 pm - 7 pm
  Friday, January 24, 2020, 10 am - 4 pm
  20.21, Raum 115

- Both courses will be continued from March 18 to March 20, 2020 at the EM Strasbourg in France. Accommodation and travel expenses will be covered.

Learning Objectives:
Students will be familiarized with methods of opportunity identification (including technology push opportunities), opportunity evaluation and business planning for a startup. In addition, they will work on a project in an international team and build the corresponding soft skills.
Below you will find excerpts from events related to this course:

### Business Strategies of Banks

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

**Lecture (V)**

**Description**

The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management’s perspective.

The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank’s corporate policy.

**Learning Content**

The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management’s perspective.

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**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.
Literature
Elective literature:

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer
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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**Events**

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**Competence Certificate**


**Prerequisites**

None

**Recommendation**

None

**Annotation**

Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu). Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed. For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu). Please note that only one of the 1.5-ECTS courses can be attended in this module.

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

**Notes**

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

Students

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

Total work load for 1.5 ECTS: ca. 45 hours

- The final presentations can be held in German or English.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the 1.5-ECTS courses can be chosen in the module.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.
Type: Examination of another type
Credits: 3
Recurrence: Each winter term
Version: 1

**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

**Events**

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**Exams**

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<td>Case Studies Seminar: Innovation Management</td>
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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:*

**Notes**
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.

**Learning Content**
The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the automotive industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course.
A short introduction to presentation techniques is planned to help students prepare the seminar papers.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.
6 COURSES

Course: Challenges in Supply Chain Management [T-WIWI-102872]

6.49 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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Events

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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

Lecture (V)

Notes

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.
Learning Content
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / "Internet of Everything in production", supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

Annotation
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

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

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

Literature
To be defined depending on the topic.
## 6.50 Course: Cognitive Systems [T-INFO-101356]

**Responsible:**  
Prof. Dr.-Ing. Rüdiger Dillmann  
Prof. Dr. Alexander Waibel

**Organisation:**  
KIT Department of Informatics

**Part of:**  
M-INFO-100819 - Cognitive Systems  
M-INFO-102233 - Further Examinations

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<td>Lecture / Practice (VÜ)</td>
<td>Waibel, Stüker, Meißner, Neumann</td>
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<td>Exams</td>
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<td>Cognitive Systems examination</td>
<td>Prüfung (PR)</td>
<td>Waibel, Dillmann</td>
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</table>
6.51 Course: Competition in Networks [T-WIWI-100005]

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

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

**Part of:** M-WIWI-101406 - Network Economics

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 3

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<tr>
<td>WS 19/20 7900292</td>
<td>Competition in Networks</td>
<td></td>
<td>Prüfung (PR)</td>
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**Competence Certificate**
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

**Prerequisites**
None.

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

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

### Competition in Networks
2561204, WS 19/20, 2 SWS, Language: German, Open in study portal

**Description**
Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture.

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

**Literature**
Will be announced in the lecture.
Below you will find excerpts from events related to this course:

**Course:** Computational Complexity Theory, with a View Towards Cryptography

**Description:**
What is an "efficient" algorithm? Can every algorithmic task be solved efficiently? Or are there inherently hard problems? Computational complexity provides a rigorous, mathematical foundation to reason about problems like these. In this course, we will discuss concepts such as

- machine model, time and space complexity, separations,
- nondeterminism, reductions, completeness,
- the polynomial hierarchy,
- probabilism, one-way functions,
- alternation, interactive proofs, zero-knowledge,

and illustrate them with practical examples. The course provides an outlook to applications of computational complexity theory, with a view towards cryptography."
6.53 Course: Computational Geometry [T-INFO-104429]

Responsibilities: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics

Part of:
- M-INFO-101214 - Algorithms in Computer Graphics
- M-INFO-102110 - Computational Geometry
- M-INFO-102233 - Further Examinations

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### Course: Computational Risk and Asset Management [T-WIWI-102878]

**Responsible:** Prof. Dr Maxim Ulrich  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-105032 - Data Science for Finance

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**Exams**

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

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

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

#### Computational Risk and Asset Management

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

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

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

The course covers several topics, among them:

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

The total workload for this course is approximately 180 hours.

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

Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization

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

Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor

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

Workload
The total workload for this course is approximately 180 hours.
6.55 Course: Computational Risk and Asset Management I [T-WIWI-107032]

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:** M-WIWI-103247 - Intelligent Risk and Investment Advisory

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**Competence Certificate**

The exam will be cancelled for the winter semester 2019/2020.

The grade consists of an exam and seven problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

**Prerequisites**

None.

**Recommendation**

None
### Course: Computational Risk and Asset Management II [T-WIWI-106494]

**Responsible:** Prof. Dr Maxim Ulrich  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103247 - Intelligent Risk and Investment Advisory

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**Competence Certificate**
The exam will be cancelled for the winter semester 2019/2020.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and 6 problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

**Prerequisites**
None.

**Recommendation**
It is recommend that students have studied the material of „Computational Risk and Asset Management I“.
6.57 Course: Computer Contract Law [T-INFO-102036]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law
M-INFO-102233 - Further Examinations

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

V Computer Contract Law
2411604, WS 19/20, 2 SWS, Language: German, Open in study portal Lecture (V)

Notes
The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

Literature

- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heussen, Benno Handbuch Vertragsverhandlung und Vertragsmanagement Verlag C.H.Beck, II. Aufl. 2002
- Schneider, Jochen Handbuch des EDV-Rechts Verlag Dr. Otto Schmidt KG, III. Aufl. 2002

Elective Literature

tba in the transparencies
6.58 Course: Computer Vision for Human-Computer Interaction [T-INFO-101347]

**Responsible:** Prof. Dr.-Ing. Rainer Stiefelhagen

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101239 - Machine Vision
M-INFO-102233 - Further Examinations

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<td>Computer Vision for Human-Computer Interaction</td>
<td>Stiefelhagen</td>
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Below you will find excerpts from events related to this course:

**Description**

In this lecture current projects of the field of image processing will be presented which deal with the visual perception of persons re. human-computer interaction.

In respect of the individual topics we will discuss various methods and algorithms, their pros and cons and state of the art:

- Face detection and localisation
- Facial expression
- Assessment of head turns and viewing direction
- Person tracking and localisation
- Articulated body tracking
- Gesture recognition
- Audio-visual speech recognition
- Multi-camera environments
- Tools and libraries

**Notes**

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- Person tracking and localisation
- Articulated body tracking
- Gesture recognition
- Audio-visual speech recognition
- Multi-camera environments
- Tools and libraries

The student acquires a basic understanding of computer vision topics within the context of human-computer interaction and learns how to apply them.

**Learning Content**

The student acquires a basic understanding of computer vision topics within the context of human-computer interaction and learns how to apply them.
**6.59 Course: Consulting in Practice [T-INFO-101975]**

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101208 - Innovative Concepts of Data and Information Management  
M-INFO-102233 - Further Examinations

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**Events**

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**Exams**

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<td>Consulting in Practice</td>
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Below you will find excerpts from events related to this course:

**Praxis der Unternehmensberatung**  
24664, WS 19/20, 2 SWS, Open in study portal

**Description**  
The market for consulting services grows annually by 20% and is therefore one of the leading growth sectors and professional fields in the future. This trend is in particular driven by the IT industry. Here, widely used standard software moves the focus of the future professional field from software development to consulting. In this context, consulting services have usually a broad definition, reaching from pure IT-focused consulting (e.g., deployment of SAP) to strategic consulting (strategy, organisation etc). In contrast to common rumors, a qualification in business studies is not a must. This opens up a diversified and exciting field with exceptional development perspectives for computer science students. The course deals thematically with the two fields consulting in general and function-specific consulting (with IT consulting as an example).

The structure of the course is oriented along the phases of a consulting project:

- Diagnosis: The consultant as an analytic problem solver.
- Strategic adjustment/redesign of the core processes: Optimisation/redesign of essential business functionality to solve the diagnosed problems in cooperation with the client.
- Implementation: Installation of the solutions in the client’s organisation for assuring the implementation.

Emphasised topics in the course are:

- Elementary problem solving: Problem definition, structuring of problems and focussing through the usage of tools (e.g., logic and hypothesis trees), creative techniques, solution systems etc.
- Obtaining information effectively: Access of information sources, interview techniques etc.
- Effective communication of findings/recommendations. Analysis/planning of communication (media, audience, formats), communication styles (e.g., top-down vs. bottom-up), special topics (e.g., arrangement of complex information) etc.
- Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.
Notes
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- Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.

At the end of the course, the participants

- have gained knowledge and understanding for the activities of the consulting process in general,
- have gained function-specific knowledge and understanding of IT consulting,
- have an overview about consulting companies,
- know concrete consulting examples,
- have experienced how effective teams work and
- have got an insight into the professional field “consulting”.

Diagnosis: The consultant as an analytic problem solver.
Strategic adjustment/redesign of the core processes: Optimisation/redesign of essential business functionality to solve the diagnosed problems in cooperation with the client.
Implementation: Installation of the solutions in the clients’ organisation for assuring the implementation.

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Diagnosis: The consultant as an analytic problem solver.
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Implementation: Installation of the solutions in the clients’ organisation for assuring the implementation.

Elementary problem solving: Problem definition, structuring of problems and focusing through the usage of tools (e.g., logic and hypothesis trees), creative techniques, solution systems etc.
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Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.

At the end of the course, the participants

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- have gained function-specific knowledge and understanding of IT consulting,
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- have got an insight into the professional field “consulting”.

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Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.

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- have gained function-specific knowledge and understanding of IT consulting,
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- know concrete consulting examples,
- have experienced how effective teams work and
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Diagnosis: The consultant as an analytic problem solver.
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Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.

At the end of the course, the participants

- have gained knowledge and understanding for the activities of the consulting process in general,
- have gained function-specific knowledge and understanding of IT consulting,
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- know concrete consulting examples,
- have experienced how effective teams work and
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Diagnosis: The consultant as an analytic problem solver.
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Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.

At the end of the course, the participants

- have gained knowledge and understanding for the activities of the consulting process in general,
- have gained function-specific knowledge and understanding of IT consulting,
- have an overview about consulting companies,
- know concrete consulting examples,
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Diagnosis: The consultant as an analytic problem solver.
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Efficient teamwork: Tools for optimising efficient work, collaboration with clients, intellectual and process leadership in the team etc.

At the end of the course, the participants

- have gained knowledge and understanding for the activities of the consulting process in general,
- have gained function-specific knowledge and understanding of IT consulting,
6.60 Course: Context Sensitive Systems [T-INFO-107499]

**Responsible:** Prof. Dr.-Ing. Michael Beigl

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-100728 - Context Sensitive Systems

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<td>Lecture (V)</td>
<td>Riedel, Beigl</td>
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6.61 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

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Exams
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<td>7900009_WS1920_HK</td>
<td>Convex Analysis</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.

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).
6.62 Course: Copyright [T-INFO-101308]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law
M-INFO-102233 - Further Examinations

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<td>Dreier, Matz</td>
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<td>Prüfung (PR)</td>
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6.63 Course: Corporate Compliance [T-INFO-101288]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics

**Part of:**  
M-INFO-101242 - Governance, Risk & Compliance  
M-INFO-102233 - Further Examinations

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6.64 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>2 SWS</td>
<td>Lecture (V)</td>
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<td>2530215</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

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

Description
The course deals with the theory of corporate finance. Students are told profound knowledge about appropriate financing of firms.

Learning Content
Topics:
- Corporate financing: Some stylized facts
- Financing capacity
- Determination of outside financing
- Liquidity management: Maturity choice
- Cash flows with hidden characteristics
- Cash flows and product markets: Strategic financial structure choice
- Investor activism
- Takeovers

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

Literature
Elective Literature
### Course: Corporate Risk Management [T-WIWI-109050]

**Responsibility:** 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

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**Exams**

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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. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

**Prerequisites**
None

**Recommendation**
None

**Annotation**

The course will exceptionally be held in the winter semester 2019/2020. Usually, however, the event takes place as a block course in the summer semester.

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

<table>
<thead>
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</table>

**Learning Content**

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

**Workload**

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


**V** Corporate Risk Management

2530218, SS 2020, SWS, Language: English, Open in study portal

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload

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

Literature


**V** Übung zu Corporate Risk Management

2530219, SS 2020, SWS, Language: English, Open in study portal

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload

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

Literature

6.66 Course: Credit Risk [T-WIWI-102645]

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

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

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 1

**Events**

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**Exams**

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</table>

**Competence Certificate**

The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The examination is offered every semester and can be repeated at every regular examination date. A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

**Prerequisites**

None

**Recommendation**

Knowledge from the course "Derivatives" is very helpful.

**Annotation**

See German version.

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

**Credit Risk**

<table>
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<tbody>
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<td>Lecture / Practice (VÜ)</td>
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</table>

**Notes**

The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

The objective of this course is to become familiar with the credit markets and the credit risk indicators like ratings, default probabilities and credit spreads. The students learn about the components of credit risk (e.g. default time and default rate) and quantify these in different theoretical models to price credit derivatives.

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

The assessment consists of a written exam following §4, Abs. 2, 1.


**Elective literature:**

6.67 Course: Critical Information Infrastructures [T-WIWI-109248]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104403 - Critical Digital Infrastructures

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<td>2511401</td>
<td>Exercises to Critical Information Infrastructures</td>
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Exams

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Competence Certificate
The alternative exam assessment consists of

- the preparation of a written elaboration as well as
- an oral examination as part of a presentation of the work.

Details of the grades will be announced at the beginning of the course.

Prerequisites
None.

Annotation

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

Critical Information Infrastructures
2511400, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)
Notes
The course critical information infrastructures introduces students to the world of these complex sociotechnical systems that permeate societies on a global scale. Students will learn to handle the complexities involved in the design, development, operation and evaluation of critical information infrastructures. In the beginning of the lecture, critical information infrastructures will be introduced on a general level.

The following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. Students will work (in a group) on a selected case and have to write a seminar paper.

There will be a short introduction to the topics for the course paper on the following topic areas. In addition, it will be possible to propose your own topics as a group in the topic areas:

- Blockchain
- Cloud Computing
- Digital Health
- Fog Computing
- Information Privacy
- Certification of critical IT-Services

In addition to introductions to the topics, an online course is also offered to introduce students to scientific writing. This means to learn how to quote, how a scientific work is structured, and in which form the results of one's research are presented. Since we offer topics in this course that also correspond to the research interests in our research group, there may also be the opportunity to work on the topics in more depth in the course of a final thesis. Students can choose a topic from a variety of topics of the topics presented, and write a course paper in a group of four students.

Learning objectives:
Students know concepts and technologies relevant for the design and reliable operation of critical information infrastructures and can leverage them to develop solutions for real-world challenges.

Notes:
Please note the changed course structure. The course will be held as a block course.

The number of participants is limited. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/3073

Please make sure that your are available at the following dates if you would like to attend the course:

- Introduction: 4 dates on which you have to participate
  - 17.10.2019, 11.30 to 13.00: Foundations of Critical Information Infrastructures. (Geb. 05.20, R1C-02)
  - 24.10.2019, 11.30 to 13.00: Introduction to topics (Geb. 05.20, R1C-02)
  - 31.10.2019: 11.30 - 13.00: Socio-Technical/Socio-Material Information Systems & Design Science Research (Geb. 05.20, R1C-02)
  - 07.11.2019, 11.30 to 13.00: The Critical Information Infrastructures Landscape (Geb. 05.20, R1C-02)
- Intermediate presentations with compulsory attendance: 13.12.2019, 10am to 4pm (Geb. 05.20, R1C-02). Exact times will be announced later.
- Final presentations with compulsory attendance: 07.02.2020, 10am to 4pm (Geb. 05.20, R1C-02). Exact times will be announced later.
- Submission of the course paper: Expected on 02.02.2019. Final date will be announced in the course.

Further information on the course structure will be announced in the first session. Depending on the number of participants the individual sessions can have a shorter duration.

The meetings will take place at the Institute AIFB, KIT Campus South, Kollegiengebäude am Kronenplatz (Geb. 05.20) in Kaiserstr. 89.

The number of participants is limited to 24 students. The registration period is from 31.08.2019 to 29.09.2019. Participation slots are expected to be allocated on 01.10.2019 and must be accepted by the student by 06.10.2019. If the slot is not accepted, the free places will be offered to the students in the waiting list.

If you have any questions regarding this registration, please contact sebastian.lins@kit.edu or dehling@kit.edu.
6.68 Course: Cryptographic Voting Schemes [T-INFO-101279]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-101197 - Computer Security
M-INFO-101198 - Advanced Topics in Cryptography
M-INFO-102233 - Further Examinations

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### 6.69 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.
6.70 Course: Data and Storage Management [T-INFO-101276]

**Responsible:** Prof. Dr. Bernhard Neumair

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101210 - Dynamic IT-Infrastructures
- M-INFO-102233 - Further Examinations

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Course: Data Mining and Applications [T-WIWI-103066]

Responsible: Rheza Nakhaeizadeh
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

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

Events
SS 2020 | 2520375 | Data Mining and Applications | 2/4 SWS | Lecture (V) | Nakhaeizadeh

Competence Certificate
- Conduction of a larger empirical study in groups
- reporting of milestones
- final presentation (app. 45 minutes)

Prerequisites
None

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

Data Mining and Applications
2520375, SS 2020, 2/4 SWS, Language: German, Open in study portal

Lecture (V)

Notes
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
Learning Content

Part one: Data Mining

Why Data Mining?

- What is Data Mining?
- History of Data Mining
- Conferences and Journals on Data Mining
- Potential Applications
- Data Mining Process:
  - Business Understanding
  - Data Understanding
  - Data Preparation
  - Modeling
  - Evaluation
  - Deployment
  - Interdisciplinary aspects of Data Mining
  - Data Mining tasks
  - Data Mining Algorithms (Decision Trees, Association Rules, Regression, Clustering, Neural Networks)
  - Fuzzy Mining
  - OLAP and Data Warehouse
  - Data Mining Tools
  - Trends in Data Mining

Part two: Examples of application of Data Mining

- Success parameters of Data Mining Projects
- Application in industry
- Application in Commerce

Workload

The total workload for this course is approximately 135 hours. For further information see German version.

Literature


- Jiawei Han, Micheline Kamber, Data Mining: Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
### 6.72 Course: Data Privacy: From Anonymization to Access Control [T-INFO-108377]

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<th>Prof. Dr.-Ing. Klemens Böhm</th>
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| Part of:             | M-INFO-101208 - Innovative Concepts of Data and Information Management  
                       | M-INFO-101256 - Theory and Practice of Data Warehousing and Mining  
                       | M-INFO-104045 - Data Privacy: From Anonymization to Access Control |
| **Type**             | Written examination         |
| **Credits**          | 3                           |
| **Recurrence**       | Irregular                   |
| **Version**          | 1                           |

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## 6.73 Course: Data Protection by Design [T-INFO-108405]

**Responsible:** PD Dr. Oliver Raabe  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101242 - Governance, Risk & Compliance

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### 6.74 Course: Data Protection Law [T-INFO-101303]

**Responsible:** Prof. Dr. Nikolaus Marsch  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101217 - Public Business Law  
- M-INFO-102233 - Further Examinations

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## 6.75 Course: Database Systems [T-INFO-101497]

- **Responsible:** Prof. Dr.-Ing. Klemens Böhm
- **Organisation:** KIT Department of Informatics
- **Part of:**
  - M-INFO-101178 - Communication and Database Systems
  - M-INFO-102233 - Further Examinations

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### Events

| SS 2020  | 24516 | Datenbanksysteme | 2 SWS | Lecture (V) | Böhm, Mülle |
| SS 2020  | 24522 | Übungen zu Datenbanksysteme | 1 SWS | Practice (Ü) | Böhm, Mülle |

### Exams

| WS 19/20  | 7500189 | Database Systems | Prüfung (PR) | Böhm |

Information Engineering and Management M.Sc.
Module Handbook as of 18.02.2020
**T 6.76 Course: Database Systems and XML [T-WIWI-102661]**

**Responsible:** Prof. Dr. Andreas Oberweis  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101456 - Intelligent Systems and Services  
M-WIWI-101477 - Development of Business Information Systems

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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:*

**Database Systems and XML**  
2511202, WS 19/20, 2 SWS, Language: German, [Open in study portal]

**Notes**

Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

**Learning objectives:**

Students

- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

**Workload:**

- Lecture 30h
- Exercise 15h
- Preparation of lecture 24h
- Preparation of exercises 25h
- Exam preparation 40h
- Exam 1h
## Course: Datamanagement in the Cloud [T-INFO-101306]

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**Prerequisites**

none
6.78 Course: Deep Learning and Neural Networks [T-INFO-109124]

**Responsible:** Prof. Dr. Alexander Waibel

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-102233 - Further Examinations  
M-INFO-104460 - Deep Learning and Neural Networks

**Type**  
Written examination

**Credits**  
6

**Recurrence**  
Each summer term

**Version**  
1

### Events

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### Exams

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6.79 Course: Deep Learning for Computer Vision [T-INFO-109796]

**Responsible:** Prof. Dr.-Ing. Rainer Stiefelhagen  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101239 - Machine Vision

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**Recommendation**  
Basic knowledge of pattern recognition as taught in the module Cognitive Systems, is expected.

**Annotation**  
The course is partially given in German and English.

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

**Deep Learning for Computer Vision**

24628, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Notes**

In recent years tremendous progress has been made in analysing and understanding image and video content. The dominant approach in Computer Vision today are deep learning approaches, in particular the usage of Convolutional Neural Networks.

The lecture introduces the basics, as well as advanced aspects of deep learning methods and their application for a number of computer vision tasks. The following topics will be addressed in the lecture:

- Introduction to Deep Learning  
- Convolutional Neural Networks (CNN): Background  
- CNNs: basic architectures and learning algorithms  
- Object Recognition with CNN  
- Image Segmentation with CNN  
- Recurrent Neural Networks  
- Generating image descriptions (Image Captioning)  
- Automatic question answering (Visual Question Answering)  
- Generative Adversarial Networks (GAN) and their applications  
- Deep Learning platforms and tools
Learning Content
The lecture introduces the basics, as well as advanced aspects of deep learning methods and their application for a number of computer vision tasks. The following topics will be addressed in the lecture:
- Introduction to Deep Learning
- Convolutional Neural Networks (CNN): Background
- CNNs: basic architectures and learning algorithms
- Object Recognition with CNN
- Image Segmentation with CNN
- Recurrent Neural Networks
- Generating image descriptions (Image Captioning)
- Automatic question answering (Visual Question Answering)
- Generative Adversarial Networks (GAN) and their applications
- Deep Learning platforms and tools

Annotation
The lecture is partially given in German and English.
# 6.80 Course: Deployment of Database Systems [T-INFO-101317]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-100780 - Deployment of Database Systems  
- M-INFO-101208 - Innovative Concepts of Data and Information Management  
- M-INFO-101256 - Theory and Practice of Data Warehousing and Mining  
- M-INFO-102233 - Further Examinations

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## Events

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## Exams

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T 6.81 Course: Derivatives [T-WIWI-102643]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2

Type
Written examination

Credits
4,5

Recurrence
Each summer term

Version
1

Events
SS 2020 2530550 Derivatives 2 SWS Lecture (V) Uhrig-Homburg, Thimme
SS 2020 2530551 Übung zu Derivate 1 SWS Practice (Ü) Uhrig-Homburg, Eska

Exams
WS 19/20 7900051 Derivatives Prüfung (PR) Uhrig-Homburg

Competence Certificate
The assessment takes place in the form of a written examination (75 minutes) according to §4(2), 1 SPO. The examination takes place during the semester break. The examination is offered every semester and can be repeated at any regular examination date. A bonus can be acquired through successful participation in the exercises. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

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

V 2530550, SS 2020, 2 SWS, Language: German, Open in study portal

Description
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

Learning Content
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

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

Literature

Elective literature:
6.82 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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**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 19/20, 2 SWS, Language: German, **Open in study portal**

**Notes**
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.
6.83 Course: Designing Interactive Systems [T-WIWI-110851]

**Responsible:** Prof. Dr. Alexander Mädche  
Dr. Stefan Morana

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

**Part of:** M-WIWI-104068 - Information Systems in Organizations  
M-WIWI-104080 - Designing Interactive Information Systems

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**Competence Certificate**

The assessment consists of a written exam of 1 hour and by submitting written papers as part of the exercise. 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**

<table>
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**Description**

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

With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. The aim of this course is to introduce the foundations, theoretical grounding, key concepts and principles as well as current practice of interactive systems. The contents of the course abstract from the technical implementation details. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

**Notes**

The lecture is complemented with a capstone project assignment, where students analyze and review existing interactive systems and suggest areas of improvement / extensions.

**Learning Content**

- Basics
- Theoretical foundations
- Key concepts and design principles for specific interactive systems classes
- Capstone project

**Literature**

The lecture bases to a large extend on


Additional literature will be provided in the lecture.
6.84 Course: Developing Business Models for the Semantic Web [T-WIWI-102851]

**Responsible:** Prof. Dr. York Sure-Vetter

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

**Part of:** M-WIWI-101488 - Entrepreneurship (EnTechnon)

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**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.
### 6.85 Course: Digital Circuits Design [T-INFO-103469]

**Responsible:** Prof. Dr. Wolfgang Karl  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-102233 - Further Examinations  
M-INFO-102978 - Digital Circuits Design

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6.86 Course: Digital Health [T-WIWI-109246]

- **Responsible:** Prof. Dr. Ali Sunyaev
- **Organisation:** KIT Department of Economics and Management
- **Part of:** M-WIWI-104403 - Critical Digital Infrastructures

### Type
Examination of another type

### Credits
4,5

### Recurrence
Each winter term

### Version
3

#### Events

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<td>7900068</td>
<td>Digital Health</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.

**Prerequisites**
None.

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

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<tr>
<th>Course Name</th>
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<tr>
<td>Digital Health</td>
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<td>Lecture (V)</td>
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Notes
The course Digital Health offers students a possibility to gain insight into current developments in the digitalization of the health care system. Students will first be introduced to the basics and challenges of the digitalization of the health care system. After the introduction lecture, the course aims to give insights into current topics in the field of digital health and offers students an opportunity to prepare a scientific paper in a group of up to three students.

There will be a short introduction lecture on all topics with regard to the written assignments. It is possible for students to write their paper in one of the following topics. Furthermore, groups of students have the possibility to propose their own topics.

- Artificial Intelligence
- Blockchain
- Cloud Computing
- Gamification
- Genomics
- Information Privacy

In addition to introduction lectures on the topics, an online course is offered to introduce students to scientific writing. This includes learning how to quote, how a scientific paper is structured and in which form the results of one's research are presented. Since we offer topics that also correspond to the research interests of our research associates, there may also be the opportunity to investigate these topics more deeply in a master thesis. Students can give their preferences for the topics offered and are afterwards assigned to groups of up to three students based on their preferences.

Learning objectives:
Students are familiar with the current developments and challenges of digitization in the health care sector, can independently develop corresponding solutions, and discuss their developed solutions in groups.

Workload:
4.5 ECTS = approx. 135 hours.

Comments:
The number of participants is limited. Please register via the WiWi portal: https://portal.wiwi.kit.edu/ys/3107

Please keep the following dates available if you are planning to attend the course:

- **Introduction:** 3 dates you have to attend
  - 10.2019, 15.45 to 17.15: Foundations of Digital Health. (Geb. 05.20, R1C-03)
  - 10.2019, 15.45 to 17.15: Cloud Computing, Genomics, Information Privacy (Geb. 05.20, R1C-03)
  - 11.2019, 15.45 to 17.15: Blockchain, Artificial Intelligence, Gamification (Geb. 05.20, R1C-03)
- **Intermediate presentation** to be attended: 04.12.2019, 10:00 to 16:00 (Building 05.20, R1A-11). Exact times will be announced soon.
- **Final presentation to be attended:** 02.2020 and 27.02.2020, 09:00 to 19:00 (Building 05.20, R1C-03). Exact times will be announced soon.
- **Submission of the written assignment:** Estimated on 12.02.2019. Final date will be announced in the event.

Further information on the procedure will be announced in the first lecture. Depending on the number of participants, each session may have a shorter duration.

The meetings will take place at the Institute AIFB, KIT-Campus Süd, Kollegiengebäude am Kronenplatz (building 05.20), Kaiserstr. 89.

The number of participants is limited to 30 students. The registration period is from **31.08.2019 to 17.10.2019**. The places are expected to be allocated on **18.10.2019** and must be accepted by the students by **22.10.2019**. If the allocation is not accepted, the free places will be offered to the students in the waiting list.

If you have any questions regarding this registration, please contact scott.thiebes@kit.edu or manuel.schmidt-kraepelin@kit.edu.
6.87 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

**Responsible:** Anja Konhäuser

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

**Part of:**
- M-WIWI-101487 - Sales Management
- M-WIWI-105312 - Marketing and Sales Management

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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**

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 cannot be guaranteed.

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

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

*Below you will find excerpts from events related to this course:*
Notes
Learning Sessions:
The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management, and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.
Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g., product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:
After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

- Understand digital marketing and sales approaches for the B2B sector
- Recognise important elements and understand how-to-setup of digital strategies
- Become familiar with the effectiveness and usage of different digital marketing channels
- Understand the effect of digital sales on sales management, customer support, and value chain
- Be able to measure and interpret digital KPIs
- Calculate the Return on Investment (RoI) for digital marketing by combining online data with company performance data

time of presentness = 15 hrs.
private study = 30 hrs.
6.88 Course: Digital Service Design [T-WIWI-105773]

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

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

**Part of:**
- M-WIWI-102806 - Service Innovation, Design & Engineering
- M-WIWI-104080 - Designing Interactive Information Systems

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**Exams**

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**Competence Certificate**

Assessment consists of a written exam of 1 hour length and by submitting written papers as part of the exercise. Details are 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:

**Digital Service Design**

2540420, WS 19/20, 3 SWS, Language: English, Open in study portal

**Description**

Designing services is different from designing products. In contrast to products being discrete and tangible objects, services are co-produced by people and only provide value when they are actually used. Digital services represent a specific category of services and specifically leverage and integrate information technology in the service delivery process.

The aim of this course is to introduce key concepts and theoretical foundations of digital service design. Furthermore, a management perspective looking at the entire service lifecycle, covering the organizational and team level as well as state-of-the-art digital service design processes (e.g. agile, lean, continuous delivery) is provided. Finally, an introduction of important digital service design practices and tools supporting user research, conceptualization & prototyping as well as evaluation is given.

The lecture is complemented with a Digital Service Design challenge, where students leverage practices and tools from the lecture to suggest improvements for an existing digital service. The challenge is carried out in cooperation with practice partners (e.g. Commerzbank).

**Learning Content**

- Definition and key concepts of digital service design and related terms
- Introduction to the business and design perspective of a service design project
- The digital service design process from strategy through planning and prototyping to launching the digital service
- Practice-oriented capstone project focusing on the design of a real-world digital service
Literature
6.89 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-INFO-102233 - Further Examinations
- M-WIWI-101448 - Service Management
- M-WIWI-102754 - Service Economics and Management

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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:

**Notes**
Formerly "Business and IT Service Management"

**Learning Content**
While the digitalization creates new opportunities for organizations, it also comes with its challenges: formerly proven business models become obsolete and need to be refined, internal processes cannot keep up with the requirements of the market and need to reassessed in any way.

The shift towards a service-based economy enables and requires companies to leverage advances in information technology to create added value for their customers. In particular, the emergence of big data and analytics enables better decision-making. The lecture teaches approaches that enable organizations to adapt their business models to new market requirements and showcases how to plan and execute a successful transformation to the desired organizational setup.

The lecture links academic content with practical examples and excises. Students are asked to actively engage in the discussion and contribute their knowledge. Invited guest speakers from industry and case studies emphasize the practical character of this lecture.

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.
Literature
Cardoso et al. (Hrsg.) (2015), Fundamentals on Service Systems
Hartmann/ Zaki/ Feldmann/ Neely (2016), Capturing value from big data - a taxonomy of data-driven business models used by start-up firms, IJPOR, 36 (10), 1382-1406.
## 6.90 Course: Digital Signatures [T-INFO-101280]

**Responsible:** Prof. Dr. Dennis Hofheinz  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101198 - Advanced Topics in Cryptography  
- M-INFO-102233 - Further Examinations

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<td>Geiselmann, Müller-Quade, Hofheinz</td>
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</table>
6.91 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

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Events

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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

Notes

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.
6.92 Course: Digital Transformation of Organizations [T-WIWI-106201]

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

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

**Part of:**
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-101448 - Service Management
- M-WIWI-102754 - Service Economics and Management
- M-WIWI-102808 - Digital Service Systems in Industry
- M-WIWI-104068 - Information Systems in Organizations

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**Exams**

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</table>

**Competence Certificate**
The assessment consists of a written exam of 1 hour length and by submitting written papers as part of the exercise. Details will be announced at the beginning of the course.

**Prerequisites**
None

**Annotation**
The course will be held in English.

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

**Description**
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, IT is considered as key enabler of operational excellence ranging from the enrichment of routine working tasks (e.g., enterprise resource planning systems) to e-enabled integration of entire business eco-systems (e.g., e-supply chains). Complementing this primarily company-internal perspective on IT, we have recently seen a massive growth of digital extensions of existing products and services across all industries. The disruptive potential of IT has already transformed selected key industries, e.g. media or retail, and its impact is continuously growing in all areas of business and society.

Large-scale information systems (IS) in organizations strongly interplay with work practices of individual employees as well as organizational structures shaping and being shaped by individuals’ behavior. Thus, successful implementation of IS requires dealing with transformation beyond technology. The ability to implement and use IS in a way supporting its overall value proposition has become a central success determinant. Accordingly, the course “Management of Information Systems” course is designed to provide a comprehensive insight into theoretical foundations, concepts, tools, and current practice of IS. The lecture is complemented with a case study. Students get the opportunity to analyze and propose solutions for a selected real-world IS implementation.
Learning Content

- Definition and key concepts of Information Systems
- Introduction of different types of application systems (organizational process & information-centric systems, customer-centric systems, supplier-centric systems and people-centric systems) and their characteristics
- The digital transformation process: The pre-implementation, implementation and post-implementation phase covering facets such as business/IT alignment, packaged software selection, IS implementation projects, as well as adoption & use of IS
- Practice-oriented case study focusing on real-world IS scenarios

Literature
**6.93 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

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**Events**

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**Competence Certificate**

The assessment consists of a written paper and an oral exam of about 30-40 min (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]

**Notes**

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.

**Learning Content**

Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

**Annotation**

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

Besides knowledge of Operations Research students are assumed to be familiar with the following topics:

- Introduction in Statistics
- Programming basics (algorithms and data structures)
- Basic knowledge in production and logistics

**Workload**

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

6.94 Course: Distributed Computing [T-INFO-101298]

- **Responsible:** Prof. Dr. Achim Streit
- **Organisation:** KIT Department of Informatics
- **Part of:**
  - M-INFO-101210 - Dynamic IT-Infrastructures
  - M-INFO-102233 - Further Examinations

**Type:** Written examination  
**Credits:** 4  
**Recurrence:** Each winter term  
**Version:** 2

### Events

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6.95 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

### Events

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#### Written examination

- **WS 19/20** 2560402 Dynamic Macroeconomics (2 SWS - Lecture (V) - Scheffel)
- **WS 19/20** 2560403 Übung zu Dynamic Macroeconomics (1 SWS - Practice (Ü) - Krause)

#### Exams

- **WS 19/20** 7900261 Dynamic Macroeconomics (Prüfung (PR) - Scheffel)

**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
None.

---

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

#### Dynamic Macroeconomics

**2560402, WS 19/20, 2 SWS, Language: English, Open in study portal**

**Description**
The course Dynamic Macroeconomics addresses macroeconomic questions on an advanced level. The main focus of this course is on dynamic programming and its fundamental role in modern macroeconomics. After starting with the necessary mathematical tools, several applications in labor economics, economic growth, and asset pricing are introduced. The course pursues a hands-on approach so that students not only gain theoretical insights but also learn numerical tools to solve dynamic economic models using the modern programming language Python.

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.

**Literature**
Literature and lecture notes are provided during the course.
# 6.96 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

**Responsible:** PD Dr. Patrick Jochem
Prof. Dr. Russell McKenna

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

**Part of:** M-WIWI-101452 - Energy Economics and Technology

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<td>Lecture (V)</td>
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**Exams**

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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)**

**Notes**

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
Learning Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

The energy efficiency part of the lecture provides an introduction to the concept of energy efficiency, the means of affecting it and the relevant framework conditions. Further insights into economy-wide measurements of energy efficiency, and associated difficulties, are given with recourse to several practical examples. The problems associated with market failures in this area are also highlighted, including the Rebound Effect. Finally and by way of an outlook, perspectives for energy efficiency in diverse economic sectors are examined.

The electric mobility part of the lecture examines all relevant issues associated with an increased penetration of electric vehicles including their technology, their impact on the electricity system (power plants and grid), their environmental impact as well as their optimal integration in the future private electricity demand (i.e. smart grids and V2G). Besides technical aspects the user acceptance and behavioral aspects are also discussed.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be announced in the lecture.
6.97 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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<td>eFinance: Information Systems for Securities Trading</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

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

**eFinance: Information Systems for Securities Trading**

2540454, WS 19/20, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Description**

The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

**Learning Content**

The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

**Workload**

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


Elective literature:

T 6.98 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-104403 - Critical Digital Infrastructures

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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.
6 COURSES

6.99 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-104403 - Critical Digital Infrastructures

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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.
6.100 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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**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:

**Notes**

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
Learning Content
The course will provide an overview of sources of air pollution, waste and municipal waste; methods to monitor and to reduce/manage pollutant flows; regulatory framework on national and international level.

A Air pollution control
- Introduction and definitions
- Sources and pollutants
- Regulatory framework
- Emission monitoring
- Air pollution control measures

B Waste management and Recycling
- Introduction and regulatory framework
- Statistics and logistics
- Recycling and disposal
- Waste treatment

C Waste water treatment
- Municipal waste water treatment systems
- Sewage sludge disposal

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
Will be announced in the course.
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<td>SS 2020</td>
<td>Employment Law I</td>
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### 6.102 Course: Employment Law II [T-INFO-101330]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101216 - Private Business Law  
M-INFO-102233 - Further Examinations  

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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
| SS 2020 | 2581003 | Energy and Environment | 2 SWS | Lecture (V) | Karl |
| SS 2020 | 2581004 | Übungen zu Energie und Umwelt | 1 SWS | Practice (Ü) | Keles, Weinand |

Exams
| WS 19/20 | 7981003 | Energy and Environment | Prüfung (PR) | Fichtner |

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

Prerequisites
None.

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

Energy and Environment
2581003, SS 2020, 2 SWS, Language: German, Open in study portal

Notes
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)

Learning Content
The focus of the lecture is put on environmental impacts of fossil fuel conversion and related assessment methods. The list of topics is given below.

- Fundamentals of energy conversion
- Air pollutant formation from fossil fuel combustion
- Control of air pollutant emissions from fossil-fuelled power plants.
- Measures to improve conversion efficiency of fossil fuelled power plants.
- External effects of energy supply (Life Cycle Assessment of selected energy systems)
- Integrated Assessment models supporting the European Thematic Strategy on Air
- Cost-effectiveness analyses and cost-benefit analyses of air pollution control measures
- Monetary evaluation of external effects of energy supply (external costs)

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

The references for further reading are included in the lecture documents (see ILIAS)
### 6.104 Course: Energy Market Engineering [T-WIWI-107501]

**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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| Exams         | 7901171 | Energy Market Engineering (Nachklausur aus dem SS19) | Prüfung (PR) | Weinhardt |

#### Competence Certificate

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

#### Prerequisites

None

#### Recommendation

None

#### Annotation

**Former course title until summer term 2017:** T-WIWI-102794 "eEnergy: Markets, Services, Systems".  
The lecture has also been added in the IIP Module Basics of Liberalised Energy Markets.

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

**Energy Market Engineering**  
2540464, SS 2020, 2 SWS, Language: German, [Open in study portal]

#### Learning Content

This lecture discusses different design options for electricity markets. We will focus on different approaches of nodal and zonal pricing as well as single price mechanisms and capacity markets. After a short recap of German and European market designs, the different design options will be discussed scientifically and with the help of examples. Furthermore, we will evaluate alternative market design options like microgrids. Besides the fundamental functioning of those markets, we will introduce and discuss methodological knowledge to evaluate market design options.

#### Annotation

The lecture has also been added in the IIP Module Basics of Liberalised Energy Markets.

#### Workload

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

6.105 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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Exams

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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 19/20, 2 SWS, Open in study portal
Notes

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.

Learning Content

The lecture "Energy Networks and Regulation" provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead ("Energiewende", redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO.
- Objectives of regulation: Fair price calculation and high standard access conditions.
- The functioning of incentive regulation
- Amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Workload

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


**Responsible:** Prof. Dr. Martin Wietschel  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101451 - Energy Economics and Energy Markets

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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.

**Prerequisites**  
None.

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

**Energy Policy**  
2581959, SS 2020, 2 SWS, Language: German, Open in study portal  
Lecture (V)

**Description**  
The course deals with material and energy policy of policy makers and includes the effects of such policies on the economy as well as the involvement of industrial and other stakeholders in the policy design. At the beginning the neoclassical environment policy is discussed. Afterwards the Sustainable Development concept is presented and strategies how to translate the concept in policy decision follows. In the next part of the course an overview about the different environmental instruments classes, evaluation criteria for these instruments and examples of environmental instruments like taxes or certificates will be discussed. The final part deals with implementation strategies of material and energy policy.

**Notes**  
The availability of cheap, environmentally friendly and secure energy is crucial for human welfare. However, the increasing scarcity of resources and increasing environmental pressures, with a particular focus on climate change, threaten human welfare through economic action. Energy contributes significantly to environmental pollution. The energy industry is characterised by high regulation and a significant influence of political decisions.

At the beginning of the lecture different perspectives on energy policy will be presented and the analysis of political decision-making processes will be discussed. Then the current energy policy challenges in the area of environmental pollution, regulation and the role of energy for households and industry will be discussed. Then the actors of energy policy and energy responsibilities in Europe will be discussed. The economic approaches from traditional environmental economics and sustainability as a new policy approach will then be discussed. Finally, energy policy instruments such as the promotion of renewable energies or energy efficiency are discussed in detail and how they can be evaluated.

The lecture emphasizes the relationship between theory and practice and presents some case studies.

**Learning Content**  
The course deals with material and energy policy of policy makers and includes the effects of such policies on the economy as well as the involvement of industrial and other stakeholders in the policy design. At the beginning the neoclassical environment policy is discussed. Afterwards the Sustainable Development concept is presented and strategies how to translate the concept in policy decision follows. In the next part of the course an overview about the different environmental instruments classes, evaluation criteria for these instruments and examples of environmental instruments like taxes or certificates will be discussed. The final part deals with implementation strategies of material and energy policy.

**Workload**  
The total workload for this course is approximately 105.0 hours. For further information see German version.
Literature
Will be announced in the lecture.
**6.107 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 19/20, 2 SWS, Language: English, Open in study portal

**Lecture (V)**

**Notes**

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

**Learning Content**

1. Overview and classification of energy systems modelling approaches  
2. Usage of scenario techniques for energy systems analysis  
3. Unit commitment of power plants  
4. Interdependencies in energy economics  
5. Scenario-based decision making in the energy sector  
6. Visualisation and GIS techniques for decision support in the energy sector
Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.
6.108 Course: Energy Trade and Risk Management [T-WIWI-102691]

**Responsible:** Dr. Clemens Cremer  
Dr. Dogan Keles  

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

**Part of:** M-WIWI-101451 - Energy Economics and Energy Markets

**Type**  
Written examination

**Credits**  
3

**Recurrence**  
Each summer term

**Version**  
2

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**Exams**

| SS 2020 | 2581020 | Energy Trade and Risk Management | 2 SWS | Lecture (V) | Keles |

| WS 19/20 | 7981020 | Energy Trade and Risk Management | Prüfung (PR) | Fichtner |

**Competence Certificate**  
The assessment consists of a written exam (60 minutes).

**Prerequisites**  
None

**Recommendation**  
None

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

**V Energy Trade and Risk Management**  
2581020, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Notes**

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

**Learning Content**

1. Introduction to Markets, Mechanisms, Interactions  
2. Basics of Risk Management  
3. Oil Markets  
4. Gas Markets  
5. Coal Markets  
6. Emission Markets  
7. Simulation Game  
8. Power Markets  
9. Risk Management in Utilities

**Annotation**

The credits have been changed from 3.5 to 4.

**Workload**

The total workload for this course is approximately 120.0 hours. For further information see German version.
Literature

Elective literature:


www.riskglossary.com
6.109 Course: Engineering FinTech Solutions [T-WIWI-106193]

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:**
- M-WIWI-103247 - Intelligent Risk and Investment Advisory
- M-WIWI-103261 - Disruptive FinTech Innovations
- M-WIWI-105036 - FinTech Innovations

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

**Prerequisites**
In order to take the course "Engineering FinTech Solutions", students must have completed the module "Data Science for Finance".

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

**Engineering FinTech Solutions**
2500020, WS 19/20, 6 SWS, Language: English, [Open in study portal](#)

**Description**
This project invites students to either pursue their own FinTech innovation project or to contribute to the Chair’s ongoing innovation projects.

**Notes**
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.

**Learning Content**
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.

**Workload**
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.
Notes
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.

Learning Content
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students.

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature will be distributed during the first lecture.
6.110 Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

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

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

**Part of:**
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovation Management

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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
**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

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**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
None

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

**Entrepreneurship**

**Description**
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of financial planning.

Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

**Learning Content**
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of financial planning.

Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.
6.112 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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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

Learning Content
Content of the seminar is most recently discussed topics in the field of entrepreneurship. Topics and dates will be communicated online via the seminar portal.

Annotation
The topics are prepared in small groups. The seminar consists of two attendance meetings (kick-off event and final presentation). Between the appointments, independent work is required. The results will be presented at the end of the semester. There is an obligation to attend all seminars.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced during/prior to the seminar as this varies from topic to topic.
6.113 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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**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:

**Environmental and Ressource Policy**

2560548, SS 2020, 2 SWS, Language: German. [Open in study portal](#)

**Workload**

The total workload for this course is approximately 120 hours. For further information see German version.

**Literature**

**Elective literature:**

Michaelis, P.: Ökonomische Instrumente in der Umweltpolitik. Eine anwendungsorientierte Einführung, Heidelberg

OECD: Environmental Performance Review Germany, Paris
### 6.114 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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**Competence Certificate**  
See German version

**Prerequisites**  
None

**Recommendation**  
It is recommended to already have knowledge in the area of macro- and microeconomics. This knowledge may be acquired in the courses Economics I: Microeconomics [2600012] and Economics II: Macroeconomics [2600014].
## 6.115 Course: Environmental Law [T-INFO-101348]

**Responsible:** Dr. Tristan Barczak  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101217 - Public Business Law  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101468 - Environmental Economics

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### Exams

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### 6.116 Course: European and International Law [T-INF0-101312]

**Responsible:** Ulf Brühann  
**Organisation:** KIT Department of Informatics  
**Part of:**  
M-INFO-101217 - Public Business Law  
M-INFO-102233 - Further Examinations

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#### Events

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<th>SS 2020</th>
<th>24666</th>
<th>Europäisches und Internationales Recht</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
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#### Exams

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<th>European and International Law</th>
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<td>7500084</td>
<td>European and International Law</td>
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</table>
### 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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**Type**

- Written examination
- Credits 4.5
- Recurrence Each winter term
- Version 1

**Competence Certificate**

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Prerequisites**

None

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

**Experimental Economics**

2540489, WS 19/20, 2 SWS, Language: German, Open in study portal

**Learning Content**

Experimental Economics have become a separate field in Economics. Nearly all fields of the economic discipline use economic experiments to verify theoretical results. Besides being used for empirical validation, this method is applied in political and strategic consulting. The lecture gives an introduction to experimental methods in economics and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

**Workload**

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

**Literature**

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2nd ed., 2006.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.
### 6.118 Course: Extraordinary additional course in the module Cross-Functional Management Accounting [T-WIWI-108651]

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

**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.
**T 6.119 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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**Exams**

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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:

**V Financial Analysis**  
2530205, SS 2020, 2 SWS, Language: English, [Open in study portal](#)

**Description**

This lecture reviews the key financial statements according to international financial reporting standards and provides analytical tools to evaluate the income statement, the balance sheet, and the cash flow statement in order to measure a firm’s liquidity, operational efficiency, and profitability.

**Learning Content**

Topics:

- Introduction to Financial Analysis
- Financial Reporting Standards
- Major Financial Statements and Other Information
- Recognition and Measurement Issues
- Analysis of Financial Statements
- Financial Reporting Quality

**Literature**

6.120 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

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**Competence Certificate**

The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**

None

**Recommendation**

Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

**Annotation**

The course takes place each second summer term: 2018/2020....

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

**V Financial Econometrics**

2520022, SS 2020, 2 SWS, Language: English, Open in study portal

**Notes**

**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

**Learning Content**

ARMA, ARIMA, ARFIMA, (non)stationarity, causality, cointegration, ARCH/GARCH, stochastic volatility models, computer based exercises
Workload
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours
6.121 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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<td>Ruckes</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

**Recommendation**
None

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

**Financial Intermediation**
2530232, WS 19/20, 2 SWS, Language: German, Open in study portal

**Description**
- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Competition in the banking sector
- Stability of the financial system
- The macroeconomic role of financial intermediation

**Learning Content**
- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Stability of the financial system
- The macroeconomic role of financial intermediation
- Principles of the prudential regulation of banks

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

**Literature**

**Elective literature:**
6.122 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)

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<td>2</td>
<td>Seminar (S)</td>
<td>Ntagiakou, Kienzle</td>
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<td>SS 2020</td>
<td>2545109</td>
<td>Basic concepts of Entrepreneurship in the area of IT security</td>
<td>2</td>
<td>Seminar (S)</td>
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**Exams**

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<td>Firm creation in IT security</td>
<td>Prüfung (PR)</td>
<td>Terzidis</td>
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</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

Course Ref: 2545109, Term: WS 19/20, 2 SWS, Language: German/English, Open in study portal
Notes
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 EnTechon 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.
Notes
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- 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.

**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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**Events**

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**Exams**

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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**

Knowledge from the course "Derivatives" is very helpful.

**Annotation**

The course is offered as a block course.

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

**Notes**

The lecture deals with both German and international bond markets, which are an important source of funding for both the corporate and the public sector. After an overview of the most important bond markets, various definitions of return are discussed. Based on that, the concept of the yield curve is presented. The modelling of the dynamics of the term structure of interest rates provides the theoretical foundation for the valuation of interest rate derivatives, which is discussed in the last part of the lecture.

The objective of this course is to become familiar with national and international bond markets. Therefore, we first have a look at financial instruments that are of particular importance. Thereafter, specific models and methods that allow the evaluation of interest rate derivatives are introduced and applied.

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

The assessment consists of a written exam following §4, Abs. 2, 1.


**Elective literature:**

**6.124 Course: Formal Systems [T-INFO-101336]**

**Responsible:** Prof. Dr. Bernhard Beckert  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-100799 - Formal Systems  
M-INFO-102233 - Further Examinations

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<td>Beckert</td>
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# 6.125 Course: Formal Systems II: Application [T-INFO-101281]

| Responsible: | Prof. Dr. Bernhard Beckert |
| Organisation: | KIT Department of Informatics |
| Part of:      | M-INFO-100744 - Formal Systems II: Application  
                M-INFO-101201 - Software Systems  
                M-INFO-102233 - Further Examinations |

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### 6.126 Course: Formal Systems II: Theory [T-INFO-101378]

**Responsible:** Prof. Dr. Bernhard Beckert  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-100841 - Formal Systems II: Theory  
- M-INFO-101201 - Software Systems  
- M-INFO-102233 - Further Examinations

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**Events**

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6.127 Course: Geometric Optimization [T-INFO-101267]

**Responsible:** Prof. Dr. Hartmut Prautzsch

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100730 - Geometric Optimization
- M-INFO-101214 - Algorithms in Computer Graphics
- M-INFO-102233 - Further Examinations

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### 6.128 Course: Global Optimization I [T-WIWI-102726]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101473 - Mathematical Programming

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**Competence Certificate**  
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.
6.129 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**
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.
6.130 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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**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. 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.
### 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](http://dol.ior.kit.edu/english/Courses.php).
### 6.132 Course: Heat Economy [T-WIWI-102695]

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#### Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

#### Prerequisites
None.

#### Recommendation
None

#### Annotation
See German version.
**6.133 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-104520 - Human Factors in Security and Privacy

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**Exams**
- **WS 19/20** 7900113 Human Factors in Security and Privacy Prüfung (PR) Volkamer

**Competence Certificate**
The lecture will not be offered in the winter semester 2019/2020.

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

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

**Prerequisites**
Successful participation in the exercises.

**Recommendation**
The prior attendance of the lecture "Information Security" is strongly recommended.

**Responsible:** Prof. Dr.-Ing. Michael Beigl

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100729 - Human Computer Interaction
- M-INFO-102233 - Further Examinations

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### 6.135 Course: Human-Machine-Interaction Pass [T-INFO-106257]

**Responsible:** Prof. Dr.-Ing. Michael Beigl  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-100729 - Human Computer Interaction  
M-INFO-102233 - Further Examinations

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Information Engineering and Management M.Sc.  
Module Handbook as of 18.02.2020
## 6.136 Course: Image Data Compression [T-INFO-101292]

**Responsible:** Prof. Dr.-Ing. Jürgen Beyerer  
Dr. Alexey Pak

**Organisation:** KIT Department of Informatics

**Part of:**  
- M-INFO-100755 - Image Data Compression  
- M-INFO-101238 - Automated Visual Inspection  
- M-INFO-101239 - Machine Vision  
- M-INFO-101241 - Image-based Detection and Classification  
- M-INFO-102233 - Further Examinations

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

### Image Data Compression

**2400112, WS 19/20, 2 SWS, Open in study portal**

**Lecture (V)**

### Notes

This module conveys to the students the theoretical and practical aspects of the principal stages in image data acquisition and compression. The discussion progresses from the coding of un-correlated sequential data streams to de-correlation of natural 2D images and to exploitation of temporal correlations in video data coding. Each considered technique is provided with a statistical justification and characterised with basic information-theoretic metrics.

In the end of the class, an outlook is given to non-conventional image-based information coding schemes (watermarking and steganography).

### Learning Content

This module conveys to the students the theoretical and practical aspects of the principal stages in image data acquisition and compression. The discussion progresses from the coding of un-correlated sequential data streams to de-correlation of natural 2D images and to exploitation of temporal correlations in video data coding. Each considered technique is provided with a statistical justification and characterised with basic information-theoretic metrics.

In the end of the class, an outlook is given to non-conventional image-based information coding schemes (watermarking and steganography).
**6.137 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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**Exams**

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**Competence Certificate**  
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.  
In case of a small number of registrations, we might offer an oral exam instead of a written exam.

**Prerequisites**  
None

**Recommendation**  
Knowledge of microeconomics, game theory, and statistics is assumed.

**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

Lecture (V)
Notes
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Aim
The student

- develops a strategic understanding about incentives systems and how they work.
- analyzes models from personnel economics.
- understands how econometric methods can be used to analyze performance and compensation data.
- knows incentive schemes that are used in companies and is able to evaluate them critically.
- can develop practical implications which are based on theoretical models and empirical data from companies.
- understands the challenges of managing incentive and compensation systems and their relationship with corporate strategy.

Workload
The total workload for this course is: approximately 135 hours.
Lecture: 32h
Preparation of lecture: 52h
Exam preparation: 51h

Literature
Slides
Additional case studies and research papers will be announced in the lecture.
6.138 Course: Industrial Services [T-WIWI-102822]

**Responsible:** Prof. Dr. Hansjörg Fromm  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101448 - Service Management  
M-WIWI-101506 - Service Analytics  
M-WIWI-102808 - Digital Service Systems in Industry

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**Exams**

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**Competence Certificate**  
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**  
None

**Recommendation**  
None

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

**Industrial Services**

2595505, WS 19/20, 2 SWS, Language: German, Open in study portal

**Lecture (V)**

**Learning Content**  
Services are becoming ever more important in business. Today, the gross income share of services in Germany exceeds 70%. Following this trend, many companies that previously focused solely on the sale of goods, strive to an extension of their business model: In order to realize new competitive advantages in domestic and international markets, they enrich their material goods with customer-specific services. This transformation to a provider of integrated solutions is called "Servitization" (Neely 2009). For this reason, so-called industrial services to companies of increasing importance. They benefit from the increasingly detailed data collected (on "Big Data"), e.g. concerning user profiles, failure statistics, usage history, accrued expenses, etc. Only these data allow in principle to end products and spare parts are delivered faster, cheaper and more targeted and technicians can be used more efficiently with the correct skills. This requires, however, also suitable methods of optimization, prognosis or predictive modeling. When used properly, such methods can minimize logistics costs, increase availability, prevent potential failures and improve repair planning. This is also enabled by latest "Technology Enabled Services" along with corresponding data transfer and analysis ("Internet of Things", automatic error detection, remote diagnostics, centralized collection of consumption data, etc.). The change from goods manufacturer to a provider of integrated solutions requires new services, transformation of business models as well as intelligent new contract types, which are addressed in the course as well.

**More specifically, the lessons of this lecture will include:**

- Servitization – The Manufacturer’s Transformation into Integrated Solution Provider
- Service Levels – Definitions, Agreements, Measurements and Service Level Engineering
- The “Services Supply Chain”
- Spare Parts Planning – Forecasting, Assortment Planning, Order Quantities and Safety Stocks
- Distribution Network Planning – Network Types, Models, Optimization
- Service Technician Planning
- Condition Monitoring, Predictive Maintenance, Diagnose Systems
- Call Center Services
- Full Service Contracts
- IT-enabled Value-Add Services – Industrial Service Innovation
Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature


6.139 Course: Information Service Engineering [T-WIWI-106423]

**Responsible:** Prof. Dr. Harald Sack

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

**Part of:** M-WIWI-101456 - Intelligent Systems and Services

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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

Lecture (V)
Notes
- Information, Natural Language and the Web
- Natural Language Processing
  - NLP and Basic Linguistic Knowledge
  - NLP Applications, Techniques & Challenges
  - Evaluation, Precision and Recall
  - Regular Expressions and Automata
  - Tokenization
  - Language Model and N-Grams
  - Part-of-Speech Tagging
- Linked Data Engineering
  - Knowledge Representations and Ontologies
  - What’s in an URI?
  - Resource Description Framework (RDF)
  - Creating new Models with RDFS
  - Querying RDF(S) with SPARQL
  - More Expressivity with Web Ontology Language (OWL)
  - The Web of Data
  - Vocabularies and Ontologies in the Web of Data
  - Wikipedia, DBpedia, and Wikidata
- Information Retrieval
  - Information Retrieval Models
  - Retrieval Evaluation
  - Web Information Retrieval
  - Document Crawling, Text Processing, and Indexing
  - Query Processing and Result Representation
  - Question Answering
- Knowledge Mining
  - From Data to Knowledge
  - Data Mining
  - Machine Learning Basics for Knowledge Mining
  - Mining Knowledge from Wikipedia
  - Named Entity Resolution
- Exploratory Search and Recommender Systems
  - Semantic Search and Entity Centric Search
  - Collaborative Filtering and Content Based Recommendations
  - From Search to Intelligent Browsing
  - Linked Data Based Exploratory Search
  - Fact Ranking

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

**Innovation Management: Concepts, Strategies and Methods**

**Notes**

The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application. The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particularly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addition to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of integrated knowledge.

**Aim:** Students develop a differentiated understanding of the different phases and concepts of the innovation process, different strategies and methods in innovation management.

**Learning Content**

The course 'Innovation Management: Concepts, Strategies and Methods' offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application.

The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which fulfil the diverse demands of the complex innovation process. The course focuses particularly on the creation of interfaces between departments and between various actors in a company's environment and the organisation of a company's internal procedures. In this context a basic understanding of knowledge and communication is taught in addition to the specific characteristics of the respective actors. Subsequently methods are shown which are suitable for the profitable and innovation-led implementation of integrated knowledge.
**Annotation**
This course was formerly named "Innovation Management".

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
A detailed bibliography is provided with the lecture notes.
6.141 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

Type
Examination of another type
Credits 3
Recurrence Irregular
Version 1

Exams
WS 19/20 7900141 Innovation Processes Live Prüfung (PR) Weissenberger-Eibl

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO). The grade consists of an exposé (15%), a guideline interview or an analysis tool (25%), a group presentation of the results (20%) and a seminar paper (40%).

Prerequisites
None.

Recommendation
Prior attendance of the course Innovation Management [2545015] is recommended.
6.142 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-101514 · Innovation Economics

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**Competence Certificate**

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

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:*
Notes
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.

Learning Content

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

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

Literature
Excerpt:

### Course: Integrated Network and Systems Management [T-INFO-101284]

**Responsible:** Prof. Dr. Bernhard Neumair  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101210 - Dynamic IT-Infrastructures  
M-INFO-102233 - Further Examinations

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6.144 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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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 CRM Architectures
2540525, WS 19/20, 2 SWS, Language: English, Open in study portal

Lecture (V)
Notes
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.
6.145 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
See German version.

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

International Finance
2530570, SS 2020, 2 SWS, Language: German, Open in study portal

Description
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First, the point of view of an international investor and second, that of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore, current exchange rate theories are discussed.

Learning Content
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First, the point of view of an international investor and second, that of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore, current exchange rate theories are discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:
6 COURSES

Course: International Management in Engineering and Production [T-WIWI-102882]

### 6.146 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

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

**Notes**
- 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

**Learning Content**
- Fundamentals of international business
- Forms of international cooperation and value creation
- Site selection
- Cost driven internationalization and site selection
- Sales and customer driven internationalization and site selection
- Challenges, risks and risk mitigation
- Management of international production sites
- Types and case studies of international production

**Workload**
The total workload for this course is approximately 105 hours. For further information see German version.
Literature
Will be announced in the course.
6.147 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-101487 - Sales Management
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). In combination with the mandatory course "Sales Management and Retailing" (3 ECTS) the module is completed.

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

International Selling – EUCOR

2572179, WS 19/20, 2 SWS, Language: English, Open in study portal

Notes

This course is offered as part of the EUCOR programme in cooperation with EM Strasbourg. Max. 10 students of KIT and max. 10 students of EM Strasbourg will develop a sales presentation in tandems (teams of 2). This is based on the value proposition of a business model developed in the LV "Business Planning for Founders - EUCOR".

- An application is required to participate in this event. The application phase usually takes place at the beginning of the lecture period. Further information on the application process can be found on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the start of the lecture period.
- Please note that the courses "Business Planning for Founders - EUCOR" (3 ECTS) and "International Selling - EUCOR" (3 ECTS) can only be taken together (6 ECTS in total). In combination with the mandatory course "Sales Management and Retailing" (3 ECTS) the module is completed.

Total workload for 3 ECTS: about 90 hours.
**6 COURSES**

**Course: Internet Law [T-INFO-101307]**

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<th>Prof. Dr. Thomas Dreier</th>
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| SS 2020 | 7500057 | Internet Law     | Prüfung (PR) |
|         |         | Dreier, Matz     |         |
### 6.149 Course: Internet of Everything [T-INFO-101337]

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101203 - Wireless Networking  
- M-INFO-101205 - Future Networking  
- M-INFO-102233 - Further Examinations

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### 6.150 Course: Introduction in Computer Networks [T-INFO-102015]

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101178 - Communication and Database Systems  
M-INFO-102233 - Further Examinations

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<td>Lecture (V)</td>
<td>Friebe, Jung, Schneider, Zitterbart</td>
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<td>SS 2020</td>
<td>24521</td>
<td>Übung zu Einführung in Rechnernetze</td>
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#### Exams

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<td>Introduction to Computer Networking</td>
<td>Prüfung (PR)</td>
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### 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>7900242</td>
<td>Introduction to Stochastic Optimization</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.
### 6.152 Course: Introduction to Video Analysis [T-INFO-101273]

**Responsible:** Prof. Dr.-Ing. Jürgen Beyerer  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-100736 - Introduction to Video Analysis  
- M-INFO-101239 - Machine Vision  
- M-INFO-101241 - Image-based Detection and Classification  
- M-INFO-102233 - Further Examinations

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Course: IT- Security Law [T-INFO-109910]

**Responsible:** PD Dr. Oliver Raabe  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101242 - Governance, Risk & Compliance

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**Responsible:** Prof. Dr. Hannes Hartenstein  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101204 - Networking Labs  
- M-INFO-101210 - Dynamic IT-Infrastructures  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101458 - Ubiquitous Computing

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### Exams

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6.155 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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**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.
6.156 Course: Knowledge Discovery [T-WIWI-102666]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-102827 - Service Computing
M-WIWI-105366 - Artificial Intelligence
M-WIWI-105368 - Web and Data Science

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Exams

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Competence Certificate
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation.
Students can be awarded a bonus on their final grade if they successfully complete special assignments.

Prerequisites
None

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

Knowledge Discovery
2511302, WS 19/20, 2 SWS, Language: English, Open in study portal

Notes
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
Notes
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.
6.157 Course: Lab Course: Natural Language Processing and Software Engineering [T-INFO-106239]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-102233 - Further Examinations
M-INFO-103138 - Lab Course: Natural Language Processing and Software Engineering

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

Lab Course: Natural Language Processing and Software Engineering
2400082, WS 19/20, 4 SWS, Language: German, Open in study portal

Annotation
We recommend to attend the course "Sprachverarbeitung in der Softwaretechnik".

Workload
150h

Literature
Needed literature will be given in the lab.
## 6.158 Course: Lab: Graph Visualization in Practice [T-INFO-106580]

**Responsible:** Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-INFO-103302 - Lab: Graph Visualization in Practice

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6.159 Course: Laboratory Course Algorithm Engineering [T-INFO-104374]

**Responsible:** Prof. Dr. Peter Sanders  
Prof. Dr. Dorothea Wagner

**Organisation:** KIT Department of Informatics

**Part of:**  
M-INFO-101199 - Advanced Algorithms: Design and Analysis  
M-INFO-101200 - Advanced Algorithms: Engineering and Applications  
M-INFO-102072 - Laboratory Course Algorithm Engineering  
M-INFO-102233 - Further Examinations

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| Events | | | |
|--------|---|----------------|
| WS 19/20 | 24305 | Practical Course in Algorithm Design |
|         | 4 SWS | Practical course (P) |
|         | Wagner, Buchhold, Zündorf, Zeitz, Sauer |

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

---

**Practical Course in Algorithm Design**  
24305, WS 19/20, 4 SWS, Language: German, Open in study portal

**Notes**

In the practical course Algorithm Engineering the students are given miscellaneous questions from algorithmics, which they have to implement independently in small working groups. The main focus lies on object oriented programming with Java or C++. Linear programming may also occur.

**Prerequisites:** Knowledge of the lecture Algorithms II is recommended.

**Learning Goals:**

The purpose of the practical course in algorithm design is to make learned knowledge work. The students are given varying topics from algorithmics, which they have to implement in small working groups. Possible topics are, for example, algorithms for flow problems, shortest path problems, or clustering techniques. In this way students learn to write efficient code.

**Workload:** Praktikum mit 4SWS, 6 LP  
6 LP entspricht ca. 180 Arbeitsstunden
6.160 Course: Language Technology and Compiler [T-INFO-101343]

**Responsible:** Prof. Dr.-Ing. Gregor Snelting

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-100806 - Language Technology and Compiler
M-INFO-102233 - Further Examinations

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**Events**

| SS 2020 | 24661 | Language Technology and Compiler | 4 SWS | Lecture (V) | Snelting |

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

**Language Technology and Compiler**

24661, SS 2020, 4 SWS, Language: German, [Open in study portal](#)

**Learning Content**

- Structure of a compiler
- Lexical analysis
- Syntactic analysis
- Semantic analysis
- Code generation
- Program Analysis
- Security Analysis
- Code optimization

- Foundations of software security analysis
- Specific technologies: LL parsing, LR/LALR parsing, attributed grammars, instruction selection, register allocation, runtime mechanisms, memory management, static single assignment form and its usage in optimization, data flow techniques, information flow control, garbage collection.

**Workload**

approx. 270 h
6.161 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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**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.
6.162 Course: Law of Contracts [T-INFO-101316]

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

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101216 - Private Business Law
- M-INFO-101242 - Governance, Risk & Compliance
- M-INFO-102233 - Further Examinations

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### 6.163 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
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<td>Liberalised Power Markets</td>
<td>2 SWS</td>
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<td>Liberalised Power Markets</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:*

#### Liberalised Power Markets
2581998, WS 19/20, 2 SWS, Language: English, [Open in study portal](#)
Notes
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
Learning Content
1. The European liberalisation process
   1.1 The concept of a competitive market
   1.2 The regulated market
   1.3 Deregulation in Europe
2. Pricing and investments in a liberalised power market
   2.1 Merit order
   2.2 Prices and investments
   2.3 Market flaws and market failure
   2.4 Regulation in liberalised markets
   2.5 Additional regulation mechanisms
3. The power market and the corresponding submarkets
   3.1 List of submarkets
   3.2 Types of submarkets
   3.3 Market rules
4. Risk management
   4.1 Uncertainties in a liberalised market
   4.2 Investment decisions under uncertainty
   4.3 Estimating future electricity prices
   4.4 Portfolio management
5. Market power
   5.1 Defining market power
   5.2 Indicators of market power
   5.3 Reducing market power
6. Market structures in the value chain of the power sector

Annotation
The course "Basics of Liberalised Energy Markets" [2581998] will be reduced to 3 credits in winter term 2015/2016 and the tutorial [2581999] is no longer offered.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

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

### Life Cycle Assessment

**2581995, WS 19/20, 2 SWS, Language: English, Open in study portal**

**Lecture (V)**

**Notes**

Introduction to life cycle assessment. The lecture describes structure and individual steps of life cycle assessment in detail.

**Learning Content**

Our society has reached a historically unique material prosperity. At the same time, environmental burdens and resource consumption are continuously reaching new peaks - not only regarding greenhouse gas emissions and oil production rates. It is obvious that the material and energy intensity of products and services has to decrease if we want to keep our current level of material prosperity on the long run. Enormous efficiency gains, as they have been reached e.g. for labour productivity, however, require that environmental burdens and resource consumption per unit of product are in the first place known, transparent and can thus be optimised. This data and its calculation are increasingly requested and sooner or later will have to become as essential for management as e.g. unit labour costs.

Life cycle assessment is a methodology in sustainability assessment that provides this information and deduces optimisation potentials and decision support for companies, politics, consumers etc. To this end, material and energy flows are compiled along the whole life cycle of a product from extraction of raw materials, via production and use of a product until its disposal. Subsequently, environmental impacts of these flows are analysed.

This lecture describes structure and individual steps of life cycle assessments in detail. Furthermore, it explains its application in decision support. In interactive phases, participants recapitulate the theoretical basis by own calculations. As an outlook, further instruments in sustainability assessment are introduced that analyse other sustainability aspects.

**Workload**

Total effort required will account for approximately 105h (3.5 credits).

**Literature**

will be announced in the course
6.165 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-103356 - Machine Learning

Type
Written examination

Credits
4,5

Recurrence
Each winter term

Version
2

Events

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<td>Lecture (V)</td>
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<td>2511501</td>
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Exams

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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
The course T-INFO-101354 "Machine Learning 1 - Basic Methods" must not be chosen.

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

Machine Learning 1 - Fundamental Methods
2511500, WS 19/20, 2 SWS, Language: German, Open in study portal

Lecture (V)

Notes
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 machine learning.
6.166 Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

负责: Prof. Dr.-Ing. Johann Marius Zöllner
组织: KIT Department of Economics and Management
部分: M-WIWI-101637 - Analytics and Statistics
       M-WIWI-103356 - Machine Learning

类型: 笔试
学分: 4.5
周期: 每个夏季学期
版本: 2

事件
SS 2020 2511502 Machine Learning 2 - Advanced methods 2 SWS 財務 (V) Zöllner
SS 2020 2511503 Exercises for Machine Learning 2 - Advanced Methods 1 SWS Practice (Ü) Zöllner

考试
WS 19/20 7900050 Machine Learning 2 – Advanced Methods Prüfung (PR) Zöllner

能力证书
此课程的评估为60分钟的笔试，根据§4(2)，1的考试规定或20分钟的口试，根据§4，Abs. 2，2的考试规定。

考试均在每学期进行，可以重复在任何定期考试日期。

先决条件
此课程T-INFO-101392 "Machine Learning 2 – Advanced Methods" 不能被选择。

你会找到与这个课程相关的事件的摘录。

机器学习2 - 高级方法
2511502, SS 2020, 2 SWS, 语言:德语, Open in study portal

笔记
机器学习和，特别是机器学习，考虑到现实中的复杂领域，是一个快速扩展的知识领域，以及多个研究和开发项目的主题。

讲座 "Machine Learning 2" 处理了先进的机器学习方法，如半监督和主动学习，深度神经网络（深度学习），脉冲网络，分层方法等。另一个焦点是嵌入和应用在真实系统中的机器学习方法。

该讲座介绍了最新的基本概念，以及扩展了基本结构，并阐明了由某些应用情景，特别是在技术（子）自主系统（机器人学，神经机器人学，图像处理等）领域的领域。

学习目标:
- 学生理解机器学习的扩展概念及其可能的应用。
- 学生能够分类，正式描述和评估机器学习的方法。
- 详细地，将机器学习的方法嵌入并应用于复杂的决策和推断系统。
- 学生能够利用他们的知识来选择适合现有问题的机器学习模型和方法。

建议:
参加讲座Machine Learning 1或类似讲座对理解这个讲座非常有帮助。
6.167 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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Exams

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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)
Notes
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.

Learning Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing.
We will use international material written in English.
We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).
The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

Literature
- In addition, several papers that will be available on ILIAS.

Übung zu Management Accounting 1 (Bachelor)
2579901, SS 2020, 2 SWS, Language: English, Open in study portal

Notes
see Module Handbook

Übung zu Management Accounting 1 (Bachelor)
2579902, SS 2020, 2 SWS, Language: English, Open in study portal

Notes
see Module Handbook
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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### Events

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### Exams

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**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

- **Type:** Lecture (V)
- **Language:** English
- **Credits:** 2 SWS
- **WS 19/20:** 2579903
- **Open in study portal**
Notes
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.

Learning Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems and customer value propositions.

We will use international material written in English.

We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).

The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

Literature
- In addition, several papers that will be available on ILIAS.
**6.169 Course: Management of IT-Projects [T-WIWI-102667]**

**Responsible:** Dr. Roland Schätzle  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101477 - Development of Business Information Systems

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**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:*

**Management of IT-Projects**  
2511214, SS 2020, 2 SWS, Language: German, [Open in study portal](#)
Notes
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

Notes
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.
### 6.170 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**

- **SS 2020**
  - 2545003  
  - Managing New Technologies  
  - 2 SWS  
  - Lecture (V)  
  - Reiß

- **Exams**
  - **WS 19/20**
    - 7900189  
    - Managing New Technologies  
    - Prüfung (PR)  
    - Reiß

**Competence Certificate**

Written exam 100% following §§, 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](#)  

**Lecture (V)**

**Learning Content**

The course provides an overview of the international development of a selected number of key technologies such as biotechnology, nanotechnology, neurotechnologies, converging technologies. Methods for monitoring new technologies including foresight approaches will be presented and the economic and social impacts of new technologies will be discussed.

**Workload**

The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**

- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;  
- Specht/Mährle; Gabler Lexikon Technologiemanagement

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

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

**Part of:**
- M-WIWI-101409 - Electronic Markets
- 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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<td>Market Engineering: Information in Institutions</td>
<td>Lecture(V)</td>
<td>2 SWS</td>
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<td>Übungen zu Market Engineering: Information in Institutions</td>
<td>Practice(Ü)</td>
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**Exams**

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<td>7900208</td>
<td>Market Engineering: Information in Institutions (Nachklausur aus SS19)</td>
<td>Prüfung(PR)</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) 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**

**Lecture (V)**

**Description**
The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

**Learning Content**
The ongoing advancements in information technology have revolutionized traditional business processes and given rise to electronic marketplaces. In contrast to physical marketplaces, electronic markets do not just evolve, but must be carefully designed, implemented and monitored and evaluated. Moreover electronic markets demand open and flexible platforms as well as adequate standards and information services. Future Market Engineers must therefore be able to consider the economic, legal and technological dimension of markets simultaneously. The lecture focuses on the discussion of (1) Microstructure, (2) IT Infrastructure, and (3) Business Structure of electronic markets. Hence, students will be taught the economic incentives that a market can impose on market participants, development models for implementing markets, and business models for the application of markets.

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

## 6.172 Course: Market Research [T-WIWI-107720]

**Responsible:** Prof. Dr. Martin Klarmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101487 - Sales Management  
- M-WIWI-101490 - Marketing Management  
- M-WIWI-101510 - Cross-Functional Management Accounting  
- M-WIWI-101647 - Data Science: Evidence-based Marketing  
- M-WIWI-105312 - Marketing and Sales Management

### Type
- Written examination  
### Credits
- 4.5

### Recurrence
- Each summer term

### Version
- 1

### Events

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<td>Market Research Tutorial</td>
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### Exams

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<td>Market Research</td>
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<td>Klarmann</td>
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</table>

### Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

### Prerequisites
None

### 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

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<td>2571150</td>
<td>SS 2020, 2 SWS, Language: English, [Open in study portal]</td>
<td>Lecture (V)</td>
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</table>
Notes
Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

The aim of this lecture is to give an overview of essential statistical methods. In the lecture students learn the practical use as well as the correct handling of different statistical survey methods and analysis procedures. In addition, emphasis is put on the interpretation of the results after the application of an empirical survey. The derivation of strategic options is an important competence that is required in many companies in order to react optimally to customer needs.

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

The total workload for this course is approximately 135.0 hours.

Presence time: 30 hours
Preparation and wrap-up of the course: 45.0 hours
Exam and exam preparation: 60.0 hours

Please note that this course has to be completed successfully by students interested in seminar or master thesis positions at the chair of marketing.
6.173 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>2 SWS</td>
<td>Lecture (V) Klarmann</td>
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<td>Practice (Ü) Halbauer</td>
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**Exams**

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<td>Prüfung (PR)</td>
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**Competence Certificate**
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation)

**Prerequisites**
The prerequisite for taking the course is the successful completion of the course Market Research [2571150].

**Recommendation**
It is strongly recommended to complete the course Market Research prior to taking the Marketing Analytics course.

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

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

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

**Marketing Analytics**

2572170, WS 19/20, 2 SWS, Language: English, [Open in study portal]

**Lecture (V)**

**Notes**

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).
6.174 Course: Marketing Strategy Business Game [T-WIWI-102835]

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

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

**Part of:**
- M-WIWI-101490 - Marketing Management
- M-WIWI-101510 - Cross-Functional Management Accounting
- M-WIWI-105312 - Marketing and Sales Management

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<th>2571183</th>
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<th>1 SWS</th>
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</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:*
Notes
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.
6.175 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-101656 - 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
### Course: Mechanisms and Applications of Workflow Systems [T-INFO-101257]

**Responsible:** Jutta Mülle  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101208 - Innovative Concepts of Data and Information Management  
- M-INFO-102233 - Further Examinations

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**Exams**

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<td>Prüfung (PR)</td>
<td>Böhm, Mülle</td>
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### 6.177 Course: Meshes and Point Clouds [T-INFO-101349]

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**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-100812 - Meshes and Point Clouds  
- M-INFO-101214 - Algorithms in Computer Graphics  
- M-INFO-102233 - Further Examinations
6 COURSES

Course: Methods in Economic Dynamics [T-WIWI-102906]

T 6.178 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

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<td>Lecture (V)</td>
<td>Ott, Bälz</td>
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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

Notes
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).

Learning Content
The workshop offers the possibility to deepen the understanding about different aspects of theoretical modelling of innovation-based growth and induced economic effects. This includes the implementation of formal models in computer algebra systems as well as recording, processing and econometric analysis of related data from relational databases (concerning for example patents or trademarks). Moreover, methods of network theory are discussed.
Annotation
The course has been added summer 2015.

Workload
The total workload for this course is approximately 45 hours.
Lecture: 15h
Preparation of lecture/exam: 30h
6.179 Course: Methods in Innovation Management [T-WIWI-110263]

**Responsible:** Dr. Daniel Jeffrey Koch

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

**Part of:** M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

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**Events**

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**Exams**

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<td>WS 19/20</td>
<td>Prüfung (PR)</td>
<td>Weissenberger-Eibl</td>
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**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 19/20, 2 SWS, Language: German, [Open in study portal](#)

**Notes**

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.
Course: Mixed Integer Programming I [T-WIWI-102719]

**Responsibility:** 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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**Events**

| WS 19/20 | 2550138 | Mixed-integer Programming I | 2 SWS | Lecture (V) | Stein |
| WS 19/20 | 2550139 | Exercises Mixed Integer Programming I | SWS | Practice (Ü) | Stein |

**Exams**

| WS 19/20 | 7900008_WS1920_HK | Mixed Integer Programming I | Prüfung (PR) | Stein |

**Competence Certificate**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.

**Prerequisite** for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite. The examination can also be combined with the examination of Mixed Integer Programming II [25140]. In this case, the duration of the written examination takes 120 minutes.

**Prerequisites**
None

**Recommendation**
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

**Annotation**
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

*Below you will find excerpts from events related to this course:*
Notes
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as with discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, portfolio optimization with limitations on the number of securities, the choice of locations to serve customers at minimum cost, and the optimal design of vote allocations in election procedures. For the algorithmic identification of optimal points of such problems an interaction of ideas from discrete as well as continuous optimization is necessary.

The lecture focusses on mixed-integer linear optimization problems and is structured as follows:

- Introduction, solvability, and basic concepts
- LP relaxation and error bounds for roundings
- Branch-and-bound method
- Gomory's cutting plane method
- Benders decomposition

The lecture is accompanied by exercises which, amongst others, offers the opportunity to implement and to test some of the methods on practically relevant examples.

Remark:
The treatment of mixed-integer nonlinear optimization problems forms the contents of the lecture "Mixed-integer Programming II".

Learning objectives:
The student

- knows and understands the fundamentals of linear mixed integer programming,
- is able to choose, design and apply modern techniques of linear mixed integer programming in practice.
6.181 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

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<tbody>
<tr>
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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).
### 6.182 Course: Mobile Communication [T-INFO-101322]

**Responsible:**  
Prof. Dr. Oliver Waldhorst  
Prof. Dr. Martina Zitterbart  

**Organisation:**  
KIT Department of Informatics  

**Part of:**  
M-INFO-100785 - Mobile Communication  
M-INFO-101203 - Wireless Networking  
M-INFO-101205 - Future Networking  
M-INFO-102233 - Further Examinations  

<table>
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<td>Each winter term</td>
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<tr>
<td>WS 19/20</td>
<td>2 SWS</td>
<td>Mobile Communications</td>
<td>Waldhorst, Jung</td>
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<tr>
<td>WS 19/20</td>
<td></td>
<td>Mobile Communication</td>
<td>Waldhorst, Zitterbart</td>
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</table>
### 6.183 Course: Model Driven Software Development [T-INFO-101278]

<table>
<thead>
<tr>
<th>Responsible:</th>
<th>Prof. Dr. Ralf Reussner</th>
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<tr>
<td>Organisation:</td>
<td>KIT Department of Informatics</td>
</tr>
<tr>
<td>Part of:</td>
<td>M-INFO-101201 - Software Systems</td>
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<td>M-INFO-101202 - Software Methods</td>
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#### Events

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#### Exams

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<th>Model Driven Software Development</th>
<th>Prüfung (PR)</th>
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</table>
6.184 Course: Modeling and Analyzing Consumer Behavior with R [T-WIWI-102899]

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

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

**Part of:**
M-WIWI-101448 - Service Management  
M-WIWI-101489 - Strategy, Communication, and Data Analysis  
M-WIWI-101506 - Service Analytics  
M-WIWI-103118 - Data Science: Data-Driven User Modeling

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**Events**

| SS 2020    | 2540470   | Modeling and Analyzing Consumer Behavior with R | 2 SWS | Lecture (V)  
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dorner, Greif-Winzrieth, Knierim</td>
</tr>
</tbody>
</table>
| SS 2020    | 2540471   | Übung zu Modeling and Analyzing Consumer Behaviour with R | 1 SWS | Practice (Ü)  
|            |           |                                                 |       | Knierim, Greif-Winzrieth, Dorner |

**Exams**


**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

**Learning Content**
Students learn the fundamental methods, algorithms and concepts for analysing consumer data. The students deepen their knowledge in working on a case study and computer exercises, especially in the areas of e-commerce and behavioural economics. In addition, students learn to write applications in R and to organize and execute larger data mining and general data analytics projects. Furthermore, students learn methods for evaluating and visualizing data.

The event will focus on the following topics:
1. basic programming concepts in R
2. data mining with R using established process models such as CRISP-DM
3. text mining and analysis of online data with R
4. working on a case study from the area of Consumer and User Analytics
5. data visualization and evaluation with R

**Annotation**
The course has been added summer term 2015.
Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Wickham, Hadley, ggplot2: Elegant Graphics for Data Analysis (Use R!), Springer 2009 (2nd edition)
6.185 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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</thead>
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<td>Modellieren und OR-Software: Fortgeschrittene Themen</td>
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<td></td>
<td></td>
<td>3 SWS Practical course (P) Pomes, Zander, Bakker</td>
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**Exams**

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<td>00019</td>
<td>Modeling and OR-Software: Advanced Topics</td>
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<tr>
<td></td>
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<td>Prüfung (PR) Nickel</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 19/20, 3 SWS, Language: German, [Open in study portal](#)

**Practical course (P)**

**Notes**

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.

**Learning 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.
Annotation
The lecture is for Master students who have already attended the introduction or have achieved comparable knowledge e.g. in a Bachelor thesis.
Interested students are requested to send an e-mail to Anika Pomes (anika.pomes@kit.edu) from now until 29.09.2019, including the Bachelor’s and the current Master’s grade transcripts. If the introduction has not been checked, please let us know how the necessary knowledge has been obtained.
For further information see the webpage of the course.
The lecture is offered in every winter term. The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.
6.186 Course: Models of Parallel Processing [T-INFO-101365]

**Responsible:** Thomas Worsch

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-100828 - Models of Parallel Processing

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<td>Lecture (V)</td>
<td>3</td>
<td>Each summer term</td>
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**Exams**

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<td>WS 19/20</td>
<td>75400003</td>
<td>Models of Parallel Processing</td>
<td>Prüfung (PR)</td>
<td>Worsch</td>
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</table>
6.187 Course: Multivariate Statistical Methods [T-WIWI-103124]

**Responsible:** Prof. Dr. Oliver Grothe

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-101637 - Analytics and Statistics
- M-WIWI-101639 - Econometrics and Statistics II
- M-WIWI-103289 - Stochastic Optimization

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

### Events

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<th>SWS</th>
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<td>Multivariate Verfahren</td>
<td>2</td>
<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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</tbody>
</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](#)

**Lecture (V)**

### Learning Content

- Graphical methods for multivariate Data
- Regression Analysis (incl. logistic regression, Ridge and Lasso)
- Principal Component, and Correspondence Analysis
- Local linear Embedding
- Multidimensional Scaling
- Hierarchical Classification

### Literature

- Comprehensive lecture notes
### Course: Network Security: Architectures and Protocols [T-INFO-101319]

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101203 - Wireless Networking  
- M-INFO-101204 - Networking Labs  
- M-INFO-101206 - Networking  
- M-INFO-102233 - Further Examinations

<table>
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<tr>
<td>SS 2020</td>
<td>24601</td>
<td>Netz sicherheit: Architekturen und Protokolle</td>
<td>2 SWS</td>
<td>Baumgart, Bless, Heseding, Zitterbart</td>
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**Exams**

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<tr>
<td>WS 19/20</td>
<td>7500277</td>
<td>Network Security: Architectures and Protocols für Wiederholer</td>
<td>Prüfung (PR)</td>
<td>Zitterbart</td>
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</table>
6.189 Course: Next Generation Internet [T-INFO-101321]

Responsible: Dr.-Ing. Roland Bless
Prof. Dr. Martina Zitterbart

Organisation: KIT Department of Informatics

Part of: M-INFO-101205 - Future Networking
M-INFO-101206 - Networking
M-INFO-102233 - Further Examinations

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Events

SS 2020     24674     Next Generation Internet     2 SWS     Lecture (V)     Bless

Exams

WS 19/20    7500016   Next Generation Internet     Prüfung (PR)     Bless, Zitterbart
WS 19/20    7500236   Next Generation Internet für Wiederholer Prüfung (PR)     Bless, Zitterbart
**6.190 Course: Non- and Semiparametrics [T-WIWI-103126]**

**Responsible:** Prof. Dr. Melanie Schienle  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101638 - Econometrics and Statistics I  
M-WIWI-101639 - Econometrics and Statistics II

### Type
- **Written examination**
- **Credits:** 4.5
- **Recurrence:** Irregular
- **Version:** 1

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<td>2 SWS</td>
<td>Practice (Ü)</td>
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<td>Schienle</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 "Applied Econometrics" [2520020]

**Annotation**  
The course takes place every second winter semester: 2018/19 then 2020/21

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

**Non- and Semiparametrics**  
2521300, WS 19/20, 2 SWS, Language: German, Open in study portal

**Lecture (V)**

**Notes**

**Learning objectives:**

The student
- has profound knowledge of non- and semiparametric estimation methods
- is capable of implementing these methods using statistical software and using them to assess empirical problems

**Content:**
Kernel density estimation, local constant and local linear regression, bandwidth choice, series and sieve estimators, additive models, semiparametric models

**Requirements:**
It is recommended to attend the course Applied Econometrics prior to this course.

**Workload:**
- Total workload for 4.5 CP: approx. 135 hours
- Attendance: 30 hours
- Preparation and follow-up: 65 hours
- Exam preparation: 40 hours
Course: Nonlinear Optimization I [T-WIWI-102724]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:** M-WIWI-101473 - Mathematical Programming

**Type**: Written examination  
**Credits**: 4.5  
**Recurrence**: Each winter term  
**Version**: 4

**Events**

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<td>Each winter term</td>
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**WS 19/20**

- 2550111: Nonlinear Optimization I  
  2 SWS  
  Lecture (V)  
  Stein
- 2550112: Exercises Nonlinear Optimization I + II  
  SWS  
  Practice (Ü)  
  Stein

**Exams**

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<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Recurrence</th>
<th>Version</th>
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<td>Prüfung (PR)</td>
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<td>Each winter term</td>
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</table>

- 7900002_WS1920_HK: Nonlinear Optimization I  
  Prüfung (PR)  
  Stein

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

**Notes**

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.
6.192 Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

Type: Written examination
Credits: 9
Recurrence: Each winter term
Version: 6

Events

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<th>Code</th>
<th>Title</th>
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<td>Nonlinear Optimization I</td>
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<td>Lecture (V)</td>
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<td>2550112</td>
<td>Exercises Nonlinear Optimization I + II</td>
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Exams

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

Notes
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.
Notes
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.
6 COURSES

6.193 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematical Programming

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Events

- **WS 19/20 2550112**
  - Exercises Nonlinear Optimization I + II
  - SWS
  - Practice (Ü)
  - Stein

- **WS 19/20 2550113**
  - Nonlinear Optimization II
  - 2 SWS
  - Lecture (V)
  - Stein

Exams

- **WS 19/20 7900003_WS1920_HK**
  - Nonlinear Optimization II
  - Prüfung (PR)
  - Stein

Competence Certificate

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

Lecture (V)

Notes

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.
6.194 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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**Events**

| SS 2020 | 2550495  | Operations Research in Health Care Management | 2 SWS | Lecture (V) | Nickel |
| SS 2020 | 2550496  | Übungen zu OR im Health Care Management       | 1 SWS | Practice (Ü) | Bakker |

**Competence Certificate**
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**
None

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

**Annotation**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

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

**Operations Research in Health Care Management**  
2550495, SS 2020, 2 SWS, Language: English, Open in study portal

**Learning Content**
In the last years reforms of the German health system, e.g. the introduction of the G-DRG-system, have put an increasing cost pressure on hospitals. Therefore their target is to improve quality, transparency, and efficiency of hospital services, e.g. by reducing the length of stay of patients. To achieve this, processes have to be analyzed in order to optimize them if necessary. When looking at the targets of optimization not only efficiency but also quality of care and patient satisfaction (e.g. waiting times) have to be taken into account.

Besides hospitals also home health care services and their planning are discussed in this lecture. Because of the demographic development this is an emerging field in the health care sector. Here, e.g. nurse rosters have to be built which give details about which nurse visits which patient at what time. While doing so different targets have to be regarded, e.g. the continuity of nurse-patient relationship or the minimization of the distances the nurses have to travel.

**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.

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

**Literature**
- 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

**Exams**

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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.
6.196 Course: Optimization Models and Applications [T-WIWI-110162]

**Responsible:** Dr. Nathan Sudermann-Merx

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

**Part of:**
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

**Type:** Written examination  
**Credits:** 4.5  
**Recurrence:** Each winter term  
**Version:** 1

### Events

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### Exams

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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 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.
### 6.197 Course: Optimization under Uncertainty [T-WIWI-106545]

**Responsible:** Prof. Dr. Steffen Rebennack  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103243 - Optimization under Uncertainty in Information Engineering and Management  
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.
6.198 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

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**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](#)

**Notes**  
**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
6.199 Course: Parallel Algorithms [T-INFO-101333]

Responsible: Prof. Dr. Peter Sanders
Organisation: KIT Department of Informatics

Part of:
- M-INFO-100796 - Parallel Algorithms
- M-INFO-101199 - Advanced Algorithms: Design and Analysis
- M-INFO-101200 - Advanced Algorithms: Engineering and Applications
- M-INFO-102233 - Further Examinations

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Prüfung (PR) Sanders
## 6.200 Course: Parallel Computer Systems and Parallel Programming [T-INFO-101345]

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<tr>
<th>Responsible:</th>
<th>Prof. Dr. Achim Streit</th>
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| Part of:      | M-INFO-101210 - Dynamic IT-Infrastructures  
                M-INFO-102233 - Further Examinations |

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**T** 6.201 Course: Parametric Optimization [T-WIWI-102855]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:** M-WIWI-101473 - Mathematical Programming

---

**Type**
Written examination

**Credits**
4,5

**Recurrence**
Irregular

**Version**
1

---

**Competence Certificate**
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

**Prerequisites**
None

**Recommendation**
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

**Annotation**
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

#### Responsible:
Prof. Dr. Thomas Dreier

#### Organisation:
KIT Department of Informatics

#### Part of:
M-INFO-101215 - Intellectual Property Law
M-INFO-102233 - Further Examinations

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#### Exams

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6.203 Course: Pattern Recognition [T-INFO-101362]

**Responsible:** Prof. Dr.-Ing. Jürgen Beyerer

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100825 - Pattern Recognition
- M-INFO-101238 - Automated Visual Inspection
- M-INFO-101239 - Machine Vision
- M-INFO-101241 - Image-based Detection and Classification
- M-INFO-102233 - Further Examinations

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

**Pattern Recognition**

24675, SS 2020, 2 SWS, Language: German, [Open in study portal](#)

**Lecture (V)**

**Description**

**Features:**
- types of features
- exploration of the feature space
- transformation of the features
- distance measures within the feature space
- normalization of features
- selection and construction of features
- reduction of the dimension of the feature space

**Classifiers:**
- Bayesian decision theory
- parameter estimation
- parameter free methods
- linear classifiers
- support vector machine
- template matching, matched filter
- classification with rejection
- classification with regard to nominal features

**General principles:**
- Vapnik-Chervonenkis theory
- evaluation of classifiers
- boosting

Information Engineering and Management M.Sc.
Module Handbook as of 18.02.2020
Learning Content
Features:
- types of features
- exploration of the feature space
- transformation of the features
- distance measures within the feature space
- normalization of features
- selection and construction of features
- reduction of the dimension of the feature space

Classifiers:
- Bayesian decision theory
- parameter estimation
- parameter free methods
- linear classifiers
- support vector machine
- template matching, matched filter
- classification with rejection
- classification with regard to nominal features

General principles:
- Vapnik-Chervonenkis theory
- evaluation of classifiers
- boosting
### 6.204 Course: Personalization and Services [T-WIWI-102848]

**Responsible:** Dr.-Ing. Andreas Sonnenbichler  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101410 - Business & Service Engineering  
- M-WIWI-101470 - Data Science: Advanced CRM

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**Competence Certificate**

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**
None

**Recommendation**
None

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

### Personalization & Services

**2540533, WS 19/20, 2 SWS, Language: German, Open in study portal**

**Learning Content**

- Personalization of Services and Applications
- User Modeling
- User Profiles
- Authentication
- Authorization
- Applications in e-Commerce and for internet-based Services
- Personalized Web Search
- Privacy
Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance
- Attending the lecture: $15 \times 90\text{min} = 22\text{h} 30\text{m}$
- Attending the exercise classes: $7 \times 90\text{min} = 10\text{h} 30\text{m}$
- Examination: $1\text{h} 00\text{m}$

Self-study
- Preparation and wrap-up of the lecture: $15 \times 180\text{min} = 45\text{h} 00\text{m}$
- Preparing the exercises: $25\text{h} 00\text{m}$
- Preparation of the examination: $31\text{h} 00\text{m}$

Sum: $135\text{h} 00\text{m}$

Literature
The course follows latest scientific papers. References to these papers are listed at the end of each course unit.
6 COURSES

Course: Planning and Management of Industrial Plants [T-WIWI-102631]

6.205 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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**Exams**

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<td>WS 19/20</td>
<td>7981952</td>
<td>Planning and Management of Industrial Plants</td>
<td>Prüfung (PR)</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 19/20, 2 SWS, Language: German, [Open in study portal]

**Lecture (V)**

Notes

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.

Learning Content

Industrial plant management incorporates a complex set of tasks along the entire life cycle of an industrial plant, starting with the initiation and erection up to operating and dismantling.

During this course students will get to know special characteristics of industrial plant management. Students will learn important methods to plan, realize and supervise the supply, start-up, maintenance, optimisation and shut-down of industrial plants. Alongside, students will have to handle the inherent question of choosing between technologies and evaluating each of them. This course pays special attention to the specific characteristics of plant engineering, commissioning and investment.

Workload

Total effort required will account for approximately 165h (5.5 credits).

Literature

will be announced in the course
6.206 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](#)

**Description**

Portfolio theory: principles of investment, Markowitz-portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

**Notes**

**Learning objectives:**

Knowledge of various portfolio management techniques in the financial industry.

**Content:**

Portfolio theory: principles of investment, Markowitz-portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, 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
Learning Content
Portfolio theory: principles of investment, Markowitz-portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, 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
The total workload for this course is approximately 150 hours. For further information see German version.

Literature
To be announced in lecture.

Elective literature:
To be announced in lecture.
### 6.207 Course: Practical Course Computer Vision for Human-Computer Interaction [T-INFO-105943]

**Responsible:** Prof. Dr.-Ing. Rainer Stiefelhagen  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101239 - Machine Vision  
- M-INFO-102233 - Further Examinations

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**Exams**

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<td><strong>Responsible:</strong></td>
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| **Part of:** | M-INFO-101206 - Networking  
M-INFO-102233 - Further Examinations |

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### 6.209 Course: Practical Course: Analysis of Complex Data Sets [T-INFO-105796]

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<tr>
<th>Responsible</th>
<th>Prof. Dr.-Ing. Klemens Böhm</th>
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| Part of              | M-INFO-101256 - Theory and Practice of Data Warehousing and Mining  
                       | M-INFO-102233 - Further Examinations  
                       | M-INFO-102807 - Practical Course: Analysis of Complex Data Sets |
| **Type**             | Completed coursework         |
| **Credits**          | 4                            |
| **Recurrence**       | Irregular                    |
| **Version**          | 1                            |
### 6.210 Course: Practical Course: Database Systems [T-INFO-103201]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101256 - Theory and Practice of Data Warehousing and Mining  
- M-INFO-101662 - Practical Course: Database Systems  
- M-INFO-102233 - Further Examinations

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Information Engineering and Management M.Sc.  
Module Handbook as of 18.02.2020
### 6.211 Course: Practical Course: Geometric Modeling [T-INFO-103207]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101214 - Algorithms in Computer Graphics  
- M-INFO-101666 - Practical Course: Geometric Modeling  
- M-INFO-102233 - Further Examinations

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#### Exams

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6.212 Course: Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data [T-INFO-106219]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101256 - Theory and Practice of Data Warehousing and Mining
- M-INFO-102233 - Further Examinations
- M-INFO-103128 - Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data

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### 6.213 Course: Practical Course: Smart Data Analytics [T-INFO-106426]

**Responsible:** Prof. Dr.-Ing. Michael Beigl  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-INFO-103235 - Practical Course: Smart Data Analytics

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T 6.214 Course: Practical Course: Web Applications and Service-Oriented Architectures (II) [T-INFO-103121]

- **Responsible:** Prof. Dr. Sebastian Abeck
- **Organisation:** KIT Department of Informatics
- **Part of:** M-INFO-104061 - Microservice-Based Web Applications

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**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>WS 19/20</td>
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<td>Practical Seminar: Information Systems &amp; Service Design</td>
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<td>SS 2020</td>
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<td>Practical Seminar: Information Systems &amp; Service Design (Master)</td>
<td>3</td>
<td>Lecture (V)</td>
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</table>

**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:**

**Practical Seminar: Information Systems & Service Design**

2540554, WS 19/20, 2 SWS, Language: English, Open in study portal

**Description**

Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: "The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes." Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypically implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

**Learning Content**

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes
Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes
6.216 Course: Practical Seminar Service Innovation [T-WIWI-102799]

**Responsible:** Prof. Dr. Gerhard Satzger  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101410 - Business & Service Engineering  
**M-WIWI-102806 - Service Innovation, Design & Engineering**

### 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.

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

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

**Part of:** M-WIWI-103118 - Data Science: Data-Driven User Modeling

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

**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.
6.218 Course: Practical Seminar: Data-Driven Information Systems [T-WIWI-106207]

**Responsible:**
- Prof. Dr. Alexander Mädche
- 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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**Competence Certificate**
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

**Prerequisites**
None

**Recommendation**
At least one module offered by the institute should have been chosen before attending this seminar.

**Annotation**
The course is held in english. The course is not offered regularly.
T 6.219 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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</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://doi.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.

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

V Practical seminar: Health Care Management
2550498, SS 2020, 3 SWS, Language: German, [Open in study portal]

Notes
Processes in a hospital are often grown historically ("We have always done it this way"), so that there has not been the need to analyze processes until reforms of the health system have put increasing pressure on hospitals. Consequently, nowadays hospitals look for possibilities to improve their processes. The students are confronted with case studies and are asked to develop a solution. Therefore they have to collect and analyze relevant data, processes and structures. When developing the solution the students have to bear in mind that besides the economic efficiency also the quality of care and patient satisfaction (e.g. measured in waiting time) may not be neglected in the health care sector.

Learning Content
Processes in a hospital are often grown historically ("We have always done it this way"), so that there has not been the need to analyze processes until reforms of the health system have put increasing pressure on hospitals. Consequently, nowadays hospitals look for possibilities to improve their processes. The students are confronted with case studies and are asked to develop a solution. Therefore they have to collect and analyze relevant data, processes and structures. When developing the solution the students have to bear in mind that besides the economic efficiency also the quality of care and patient satisfaction (e.g. measured in waiting time) may not be neglected in the health care sector.

Annotation
The lecture is offered every term.
The planned lectures and courses for the next three years are announced online.
Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Elective literature:

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
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](#)

**Description**

Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: "The destiny of computers – like other mass technologies like electricity, paper, and running water - is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes." Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

**Learning Content**

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes
6.221 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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**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.
6.222 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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<td>SS 2020</td>
<td>Exercise Price Management</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Glenn</td>
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</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:

**Price Management**

2540529, SS 2020, 2 SWS, Language: German, Open in study portal

**Lecture (V)**

**Learning Content**

1. Introduction to Price Management
2. Pricing Strategies
3. Information Base for Pricing in Price Management
4. Price-Sales Function, Price Elasticity and Survey Methods
5. Procedure of the Price Formation and innovative Pricing-Models
6. Willingness of Payment, Value, Methods of Measuring Value and Value-Based Pricing
7. Behavioural Science and Psychology of Prices
8. Multidimensional Pricing and Price Differentiation
9. Product-Spanning Price Optimisation and Bundling
11. Price Management for Services and Solutions
12. Excursion: Pricing-Tools, Professional Software for Pricing
13. Enforcing Prices, Discounting and Systems of Terms and Conditions
14. Communication of Prices, Price Adjustments and Controlling
15. International Pricing and Global Price Management
16. Pricing and Competition Law
17. Organisational Forms of Pricing, Processes, Development Paths, and Change Management in Enterprises
Annotation
The course is generally held as block course.

Workload
The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance
- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
6.223 Course: Price Negotiation and Sales Presentations [T-WIWI-102891]

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

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

**Part of:**  
M-WIWI-101487 - Sales Management  
M-WIWI-105312 - Marketing and Sales Management

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**Exams**

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<td>Klarmann</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**

Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu).

Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.

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

Please note that only one of the courses from the election block can be attended in the module.

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

<table>
<thead>
<tr>
<th>Price Negotiation and Sales Presentations</th>
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<tbody>
<tr>
<td>2572198, WS 19/20, 1 SWS, Language: German</td>
<td>Open in study portal</td>
</tr>
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</table>

**Notes**

At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

Students

- gain a clear impression of the theoretical knowledge about price negotiations and sales presentations
- improve their own negotiation abilities

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

The total workload for this course is approximately 45.0 hours. For further information see German version.

- In order to participate in this course, you need to apply. Applications usually start with the lecture period in the winter term. Detailed information on the application process is provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the 1.5 ECTS courses can be chosen in the module.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.
6.224 Course: Pricing [T-WIWI-102883]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101487 - Sales Management
        M-WIWI-101489 - Strategy, Communication, and Data Analysis
        M-WIWI-101490 - Marketing Management
        M-WIWI-101510 - Cross-Functional Management Accounting

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Exams

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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

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

V Pricing 2572157, WS 19/20, 2 SWS, Language: German, Open in study portal

Notes
This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

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

For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).
Course: Product and Innovation Management [T-WIWI-109864]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of:
- M-WIWI-101490 - Marketing Management
- M-WIWI-101510 - Cross-Functional Management Accounting
- M-WIWI-101514 - Innovation Economics
- M-WIWI-105312 - Marketing and Sales Management

Type: Written examination
Credits: 3
Recurrence: Each summer term
Version: 1

Events
| SS 2020 | 2571154 | Product and Innovation Management | 2 SWS | Lecture (V) | Feurer |

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

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

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

Notes
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).
### 6.226 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>Übung zu Produktions- und Logistikmanagement</td>
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**Exams**

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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**

**Lecture (V)**

**Description**

This course covers central tasks and challenges of an operative production and logistics management. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Methods to solve these tasks will be explored with respect to manufacturing program planning, material and time. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in PPS. Finally, commercially available PPS-, ERP- and Advanced Planning Systems will be presented and discussed.

**Notes**

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.

**Learning Content**

This course covers central tasks and challenges of operational production and logistics management. Systems analytically, central planning tasks are discussed. Exemplary solution approaches for these tasks are presented. Further practical approaches are explained. Students get to know the set-up and mode of operation of planning systems such as PPS-, ERP- and Advanced Planning Systems to cope with the accompanying planning tasks. Alongside to MRP II, students will be introduced to integrated supply chain management approaches in Supply Chain Management.

**Workload**

Total effort required will account for approximately 165h (5.5 credits).
Literature
will be announced in the course
6.227 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-103356 - Machine Learning

**Type:** Examination of another type

**Credits:** 4.5

**Recurrence:** Each winter term

**Version:** 2

### Events

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<td>3 SWS</td>
<td>Practical course (P)</td>
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### Exams

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<td>Zöllner</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

### Notes

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.
Guarantor
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation
KIT Department of Economics and Management

Module
M-WIWI-103356 - Machine Learning

Type
Examination of another type

Credits
4.5

Recurrence
Each summer term

Version
2

Events
SS 2020  2512500  Project Lab Machine Learning  3 SWS  Practical course (P)  Zöllner

Competence Certificate
The alternative exam assessment consists of:

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

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

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

Notes
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.

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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.
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>Project Management</td>
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<td>Lecture</td>
<td>Schultmann, Volk, Wiens, Schumacher, Rosenberg, Wehrle</td>
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<td>WS 19/20</td>
<td>2581964</td>
<td>Übung zu Project Management</td>
<td>1</td>
<td>Practice</td>
<td>Volk, Wiens, Schumacher, Rosenberg, Wehrle</td>
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**Exams**

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

**Notes**

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
Learning Content

1. Introduction
2. Principles of Project Management
3. Project Scope Management
4. Time Management and Resource Scheduling
5. Cost Management
6. Quality Management
7. Risk Management
8. Stakeholder
9. Communication, Negotiation and Leadership
10. Project Controlling

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course
Below you will find excerpts from events related to this course:

### Notes

At the end of the course, the participants:

- Know the principles of project management and are able to make use of them in real-world case studies.
- Have profound knowledge about project phases, principles of project planning, fundamental elements such as project charter & scope definitions, descriptions of project goals, activity planning, milestones, project-structure plans, agenda and cost planning and risk management. Further, they know principle elements of project implementation, crisis management, escalation and, last but not least, project-termination activities.
- Understand and are able to adopt the fundamentals of planning as well as the subjective factors which are relevant in a project. This includes topics such as communication, group processes, teambuilding, leadership, creative solution methods and risk-assessment methods.

The following key skills are taught:

- Project planning
- Project control
- Communication
- Leadership behavior
- Crisis management
- Identification of and solutions of difficult situations
- Team building
- Motivation (of oneself and of others)

### Learning Content

- General project conditions
- Project goals / creative methods for identifying project goals and priorities
- Project planning
- Activity planning
- Cost/time/resource planning
- Phase models
- Risk management
- Project control / success control / monitoring
- Crisis management
- Project termination / lessons learned
**6.231 Course: Provable Security in Cryptography [T-INFO-101259]**

**Responsible:** Prof. Dr. Dennis Hofheinz  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101198 - Advanced Topics in Cryptography  
M-INFO-102233 - Further Examinations

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6.232 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

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**Competence Certificate**
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

**Prerequisites**
None

**Recommendation**
Basic knowledge of Public Finance is required.

_Below you will find excerpts from events related to this course:_

**Public Management**  
2561127, WS 19/20, 3 SWS, Language: German, [Open in study portal](#)  
Lecture / Practice (VÜ)

**Learning Content**
The lecture "Public Management" deals with the economic theory of public sector administration. It is divided into four parts. The first section gives an overview of the legal framework of governmental administration in the Federal Republic of Germany and introduces the classical theory of administration as developed by Weber. Part two studies concepts of public decision-making, which have a significant impact on the operation of public sector administrations and where one focus is on consistency problems of collective decision-making. The third chapter deals with efficiency problems arising in conventionally organized public administrations and companies. X-inefficiency, information and control problems, the isolated consideration of income-spending relations as well as rent-seeking problems will be considered. In section four the concept of New Public Management, which is a new approach to public sector administration that is mainly based in contract theory, is introduced. Its foundations in institutional economics are developed, with a focus on the specific incentive structures in self-administered administrations. Finally, the achievements of New Public Management approaches are discussed.

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

**Literature**

**Elective literature:**
### 6.233 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  
- M-INFO-102233 - Further Examinations

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**6.234 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

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### Exams

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**Competence Certificate**
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

**Prerequisites**
None

**Recommendation**
Basic knowledge of Public Finance is required.

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

**Public Revenues**

2560120, SS 2020, 2 SWS, Language: German, Open in study portal

**Lecture (V)**

**Description**
The Public Revenues lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

**Notes**
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.
Learning Content
The Public Revenues lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

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

Literature
Elective literature:
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

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### Competence Certificate

The assessment is carried out in form of twelve weekly Python programming tasks and offered each winter term. The grade of this course is determined by the points achieved in the programming tasks.

### Prerequisites

None.

### Recommendation

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

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

#### Python for Computational Risk and Asset Management

**2500016, WS 19/20, 2 SWS, Language: English, Open in study portal**

**Practical course (P)**

**Description**

The aim of this course is to provide students with strong knowledge in Python to independently solve real-world data problems related to automated robo investment advisory.

**Notes**

The aim of this course is to provide students with strong knowledge in Python to independently solve real-world data problems related to automated robo investment advisory.

The course covers several topics from a programming perspective, among them:

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

The total workload for this course is approximately 90 hours.

Prior knowledge of AIFB programming and KIT statistics classes is recommended.

The course introduces students to Python. Students will solve problems related to the agenda of the lecture 'Computational Risk and Asset Management'. This enables them to work with financial data, perform various statistical analysis and estimate their own time series models.
Learning Content
The course covers several topics from a programming perspective, among them:

Quantitative Portfolio Strategies: Extensions to Mean-Variance Portfolio Optimization

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

Financial Economics: Rationalizing Risk Premiums via Stochastic Discount Factor

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

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

**Responsible:** Dr. Dogan Keles
Patrick Plötz

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

**Part of:** M-WIWI-101451 - Energy Economics and Energy Markets

**Type**
- Written examination

**Credits**
- 3

**Recurrence**
- Each winter term

**Version**
- 1

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<td>Übung zu Quantitative Methods in Energy Economics</td>
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**Exams**
- WS 19/20 | 7981007 | Quantitative Methods in Energy Economics | Prüfung (PR) | Fichtner |

**Competence Certificate**
The assessment consists of a written exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

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

**Quantitative Methods in Energy Economics**
- 2581007, WS 19/20, 2 SWS, Language: English, Open in study portal (Lecture (V))

**Notes**
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.

**Learning Content**
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

**Workload**
The total workload for this course is approximately 120 hours. For further information see German version.
### 6.237 Course: Randomized Algorithms [T-INFO-101331]

**Responsible:** Thomas Worsch  
**Organisation:** KIT Department of Informatics

**Part of:**  
- M-INFO-100794 - Randomized Algorithms  
- M-INFO-101199 - Advanced Algorithms: Design and Analysis  
- M-INFO-101200 - Advanced Algorithms: Engineering and Applications  
- M-INFO-102233 - Further Examinations

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**6.238 Course: Recommender Systems [T-WIWI-102847]**

**Responsible:** Prof. Dr. Andreas Geyer-Schulz  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101410 - Business & Service Engineering  
M-WIWI-101470 - Data Science: Advanced CRM

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

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**Competence Certificate**

Written examination (60 minutes) according to §4(2), 1 SPO. The exam is considered passed if at least 50 out of a maximum of 100 possible points are achieved. The grades are graded in five steps (best grade 1.0 from 95 points). Details of the grade formation and scale will be announced in the course.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**

None

**Recommendation**

None

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

**Recommender Systems**

2540506, SS 2020, 2 SWS, Language: German, Open in study portal

Lecture (V)
Notes
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 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
6.239 Course: Regulation Theory and Practice [T-WIWI-102712]

**Responsible:** Prof. Dr. Kay Mitusch  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101406 - Network Economics  

**Type**: Oral examination  
**Credits**: 4.5  
**Recurrence**: see Annotations  
**Version**: 2

**Competence Certificate**  
The lecture is not offered for an indefinite period of time.  
Result of success is made by a 20-30 minutes oral examination. Examination is offered every semester and can be retried at any regular examination date.

**Prerequisites**  
None

**Recommendation**  
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor’s degree) are expected.  
Particularly helpful but not necessary: Industrial Economics and Principal-Agent- or Contract theories. Prior attendance of the lecture Competition in Networks [26240] is helpful in any case but not considered a formal precondition.

**Annotation**  
The lecture is not offered for an indefinite period of time.
**6.240 Course: Requirements Engineering [T-INFO-101300]**

**Responsible:** Prof. Dr.-Ing. Anne Koziolek  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101201 - Software Systems  
M-INFO-101202 - Software Methods  
M-INFO-102233 - Further Examinations

**Type**  
Written examination  
**Credits**  
3  
**Recurrence**  
Each summer term  
**Version**  
2

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**Recommendation**  
Das Modul Softwaretechnik II wird empfohlen.

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

**Requirements Engineering**  
2400050, SS 2020, 2 SWS, Language: English, Open in study portal  
**Lecture (V)**

**Description**  
Having a good requirements specification is a critical prerequisite for any successful software project. This lecture gives an introduction to processes, methods and representation forms for specifying and managing requirements.

The topics include background and general overview, processes and methods for requirements elicitation, specification with natural language, object-oriented specification, use cases, UML, specification of quality requirements and constraints, as well as requirements validation and management.

**Notes**  
General remarks: The lecture is held in English and all lecture material is in English. The lecture will be recorded and the recordings will be made available on the Ilia platform.

**Workload**  
Two SWS (1.5 hours) of lecture per week in 15 weeks plus ca. 15 hours preparation for the exam = 90h
Literature
The lecture is based on slides and works by Martin Glinz, which is why there is no book that accompanies the lecture. Students are welcome to discuss differences between the lecture and the content of the course in class.


Further reading:

6.241 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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<td>1 SWS</td>
<td>Practice (Ü)</td>
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**Exams**

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**Competence Certificate**

The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

None

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

**Risk Management in Industrial Supply Networks**

2581992, WS 19/20, 2 SWS, Language: English, Open in study portal

**Lecture (V)**

**Notes**

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
Learning Content

- supply chain management: introduction, aims and trends
- industrial risk management
- definition and characterization of risks: sourcing and procurement, demand, production and infrastructure
- identification of risks
- risk controlling
- risk assessment and decision support tools
- risk prevention and mitigation strategies
- robust design of supply chain networks
- supplier selection
- capacity management
- business continuity management

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course
# 6.242 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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<th>2545102</th>
<th>Technology Assessment</th>
<th>2 SWS</th>
<th>Seminar (S)</th>
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**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**

**Notes**
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.

**Learning Content**
Roadmapping is a method used to support innovation decisions in the early phase of innovation management. The roadmapping process addresses the procedure of constructing roadmaps which can then be assessed. Roadmapping provides structured and graphical visualizations of preferably future-oriented topics which have innovation potentials. The benefits of the roadmapping method lie in the structured bundling of both technology- and market-driven individual topics and the joint setting of priorities and processes to achieve predetermined corporate targets. As a rule, roadmaps represent a consensus reached by the people involved in their compilation. For this reason, roadmaps are suited to the designation and initial prioritization of emerging technologies and corresponding development projects.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.
## 6.243 Course: Robotics I - Introduction to Robotics [T-INFO-108014]

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<th>Prof. Dr.-Ing. Tamim Asfour</th>
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### Exams

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</table>
Below you will find excerpts from events related to this course:

Notes
The lecture presents current work in the field of humanoid robotics that deals with the implementation of complex sensorimotor and cognitive abilities. In the individual topics different methods and algorithms, their advantages and disadvantages, as well as the current state of research are discussed.

The topics addressed are: biomechanical models of the human body, biologically inspired and data-driven methods of grasping, active perception, imitation learning and programming by demonstration as well as semantic representations of sensorimotor experience

Learning Objectives:
The students have an overview of current research topics in autonomous learning robot systems using the example of humanoid robotics. They are able to classify and evaluate current developments in the field of cognitive humanoid robotics.

The students know the essential problems of humanoid robotics and are able to develop solutions on the basis of existing research.

Learning Content
The lecture presents current work in the field of humanoid robotics that deals with the implementation of complex sensorimotor and cognitive abilities. In the individual topics different methods and algorithms, their advantages and disadvantages, as well as the current state of research are discussed.

The topics addressed are: biomechanical models of the human body, biologically inspired and data-driven methods of grasping, active perception, imitation learning and programming by demonstration as well as semantic representations of sensorimotor experience

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

### Notes

The lecture supplements the lecture Robotics I with a broad overview of sensors used in robotics. The lecture focuses on visual perception, object recognition, simultaneous localization and mapping (SLAM) and semantic scene interpretation. The lecture is divided into two parts:

In the first part a comprehensive overview of current sensor technologies is given. A basic distinction is made between sensors for the perception of the environment (exteroceptive) and sensors for the perception of the internal state (proprioceptive).

The second part of the lecture concentrates on the use of exteroceptive sensors in robotics. The topics covered include tactile exploration and visual data processing, including advanced topics such as feature extraction, object localization, simultaneous localization and mapping (SLAM) and semantic scene interpretation.

### Learning Objectives:

Students know the main sensor principles used in robotics and understand the data flow from physical measurement through digitization to the use of the recorded data for feature extraction, state estimation and environmental modeling.

Students are able to propose and justify suitable sensor concepts for common tasks in robotics.

### Learning Content

The lecture supplements the lecture Robotics I with a broad overview of sensors used in robotics. The lecture focuses on visual perception, object recognition, simultaneous localization and mapping (SLAM) and semantic scene interpretation. The lecture is divided into two parts:

In the first part a comprehensive overview of current sensor technologies is given. A basic distinction is made between sensors for the perception of the environment (exteroceptive) and sensors for the perception of the internal state (proprioceptive).

The second part of the lecture concentrates on the use of exteroceptive sensors in robotics. The topics covered include tactile exploration and visual data processing, including advanced topics such as feature extraction, object localization, simultaneous localization and mapping (SLAM) and semantic scene interpretation.

### Workload

90h
### 6.246 Course: Security [T-INFO-101371]

**Responsible:** Prof. Dr. Dennis Hofheinz  
Prof. Dr. Jörn Müller-Quade

**Organisation:** KIT Department of Informatics

**Part of:**  
M-INFO-101197 - Computer Security  
M-INFO-101207 - Networking Security - Theory and Praxis  
M-INFO-102233 - Further Examinations

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6.247 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-104403 - Critical Digital Infrastructures

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**Events**

| SS 2020 | 2512403 | Praktikum Blockchain (Master) | SWS | Practical course (P) | Sunyaev, Beyene, Kannengießer |

**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".
### 6.248 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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6.249 Course: Selected Topics in Cryptography [T-INFO-101373]

**Responsible:** Prof. Dr. Jörn Müller-Quade

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101198 - Advanced Topics in Cryptography
- M-INFO-102233 - Further Examinations

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**Exams**

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6.250 Course: Selling IT-Solutions Professionally [T-INFO-101977]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-101208 - Innovative Concepts of Data and Information Management
         M-INFO-102233 - Further Examinations

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### Course: Semantic Web Technologies [T-WIWI-110848]

**Responsible:** Prof. Dr. York Sure-Vetter  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101455 - Web Data Management  
M-WIWI-105366 - Artificial Intelligence

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#### Events

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<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Sure-Vetter, Acosta Deibe, Käfer</th>
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<td>Exercises to Semantic Web Technologies</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Sure-Vetter, Acosta Deibe, Käfer</td>
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**Competence Certificate**

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

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

**Prerequisites**

None

**Recommendation**

Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required.

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

### Semantic Web Technologies

2511310, SS 2020, 2 SWS, Language: English, [Open in study portal](#)
Notes
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

Exercises to Semantic Web Technologies
2511311, SS 2020, 1 SWS, Language: English, Open in study portal

Notes
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.
### 6.252 Course: Seminar in Business Administration A (Master) [T-WIWI-103474]

**Responsible:** Professorenschaft des Fachbereichs Betriebswirtschaftslehre  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-102736 - Seminar Module Economic Sciences

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6 COURSES

Course: Seminar in Business Administration A (Master) [T-WIWI-103474]

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

Notes
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.

Seminar in Data Science for Finance
2500029, WS 19/20, 2 SWS, Language: English, Open in study portal

Description
The aim of this seminar is to master real-world challenges of computational risk and asset management. The CRAM team offers a wide range of topics across different asset classes and different stages of the investment process.
Notes
The aim of this seminar is to master real-world challenges of computational risk and asset management. The CRAM team offers a wide range of topics across different asset classes and different stages of the investment process.

Students will work on a quantitative problem related to risk and asset management. This seminar is ideally suited for students who want to deepen and apply their statistics / programming skills and knowledge about financial markets. Industry-relevant problems will be solved with financial data and modern statistical tools in close collaboration with a supervisor. Topics which students solved in the past include the option-based pricing of dividends during the Euro crisis, the estimation of risk neutral moments with high-frequency data and the application of a particle filter to estimate stochastic volatility. The current topics will be presented during the first meeting.

Learning Content
Students will work on a quantitative problem related to risk and asset management. This seminar is ideally suited for students who want to deepen and apply their statistics / programming skills and knowledge about financial markets. Industry-relevant problems will be solved with financial data and modern statistical tools in close collaboration with a supervisor. Topics which students solved in the past include the option-based pricing of dividends during the Euro crisis, the estimation of risk neutral moments with high-frequency data and the application of a particle filter to estimate stochastic volatility. The current topics will be presented during the first meeting.

**Data Science in Service Management**
2540473, WS 19/20, 2 SWS, Language: German/English, [Open in study portal](#)

**Masterseminar in Data Science and Machine Learning**
2540510, WS 19/20, 2 SWS, Language: German, [Open in study portal](#)

**Workload**
The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

**Digital Service Design Seminar**
2540559, WS 19/20, 2 SWS, [Open in study portal](#)

**Description**
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

**Learning Content**
- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

**Methoden im Innovationsmanagement**
2545107, WS 19/20, 2 SWS, Language: German, [Open in study portal](#)
Notes
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.

Students
• can exploit a literature field systematically
• are able to write an academic paper in a formally correct way
• can assess the relevance and quality of sources
• are able to get an overview of sources very quickly
• know how to find relevant sources for a literature field
• are capable to write a convincing outline
• know how to categorize a subject under a research field
• understand how to systematize literature fields theoretically and empirically with the help of literature tables
• can identify the most important findings in a huge number of sources
• are able to present a research field
• can discuss the theoretical and practical implications of a topic
• are capable to identify interesting research gaps

The total workload for this course is approximately 90 hours. For further information see German version.

Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)
Notes
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.

Learning Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four to five meetings that are spread throughout the semester.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.
Notes
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, SS 2020, 2 SWS, Language: German, Open in study portal

Notes
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.

Advances in Financial Machine Learning
2530372, SS 2020, 2 SWS, Language: English, Open in study portal

Notes
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.
Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

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

Literature
Literature will be distributed during the first lecture.

Data-Driven Investments
2530374, SS 2020, 2 SWS, Language: English, Open in study portal

Notes
The digitalization is not only changing today’s society but also companies’ business models, in particular of the financial industry. In general, the large variety of digitalized processes and connected devices (Industry 4.0) generates a huge amount of data which can be used to extract valuable (investment) insights. For this task data science skills are essential.

In this seminar we will use modern data science techniques to analyze all kinds of financial and economic data, ranging from big data intra-day option prices to alternative datasets, like textual statements. For this empirical analysis we will use the state of the art Python programming language.

In a bi-weekly schedule you and your supervisor will first learn and discuss important data science concepts and then apply it in a practical FinTech-type analysis using real-world data. As a prerequisite students should already have basic finance knowledge.

Seminar in Finance
2530580, SS 2020, 2 SWS, Language: German, Open in study portal

Learning Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

Masterseminar in Data Science and Machine Learning
2540510, SS 2020, 2 SWS, Language: German/English, Open in study portal

Literature


Hospital Management
2550493, SS 2020, 2 SWS, Language: German, Open in study portal

Description
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.
Learning Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals and relates this to common and expected conditions of other service industries. Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Annotation
It is planned to offer the course every semester.

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

Notes
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.

Learning Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.
Notes
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.

Learning Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101514 - Innovation Economics

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Exams

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<th>Ott</th>
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<tr>
<td>WS 19/20</td>
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Competence Certificate
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted 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.
### 6.254 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-102736 - Seminar Module Economic Sciences

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<td>WS 19/20 2560141 Morals &amp; Social Behavior (Bachelor &amp; Master)</td>
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<tr>
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<td>Seminar (S)</td>
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<td>SS 2020 2560282 Wirtschaftspolitisches Seminar</td>
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<td>SS 2020 2560554 Fighting Climate Change, Seminar on Morals and Social Behavior (Bachelor)</td>
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<td>SS 2020 2560556 Designing the Digital Economy, Topics on Political Economy (Bachelor)</td>
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<td>WS 19/20 7900186 Seminar Debt, Money and Markets: Economic Narrative and Anthropological Evidence</td>
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<td>WS 19/20 7900221 Topics in Experimental Economics</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:

<table>
<thead>
<tr>
<th>Topics in Political Economy (Bachelor)</th>
<th>Seminar (S)</th>
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</thead>
<tbody>
<tr>
<td>2560140, WS 19/20, 2 SWS, Language: English, Open in study portal</td>
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</tbody>
</table>

Notes
For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.
Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare
Seminar Papers of 8–10 pages are to be handed in.
For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%). Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.
Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

<table>
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<tr>
<th>Morals &amp; Social Behavior (Bachelor &amp; Master)</th>
<th>Seminar (S)</th>
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<tr>
<td>2560141, WS 19/20, 2 SWS, Language: English, Open in study portal</td>
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</table>

Notes
For Bachelor students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.
The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare
Seminar Papers of 8–10 pages are to be handed in.
For bachelor students grades will be based on the quality of presentations in the seminar (50%) and the seminar paper (50%).
For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%).
Additionally Master students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade.
Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.
Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.
Notes
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

Seminar Papers of 8–10 pages are to be handed in.

For Master students, grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with their paper – one with a maximum length of 100 words and one with a maximum length of 150 words. The quality of abstracts will reflect with 20% in the final grade. Students can improve their grades by 0.3 for good and constructive discussion contributions or by 0.7 for excellent and constructive discussion contributions.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Workload
About 90 hours.

Advanced Topics in Econometrics
2521310, SS 2020, 2 SWS, Language: English, Open in study portal

Annotation
The course will be offered in English.

Fighting Climate Change, Seminar on Morals and Social Behavior (Bachelor)
2560554, SS 2020, 2 SWS, Language: English, Open in study portal

Description
For a long time, economists studied given markets and mechanisms to predict outcomes, future developments or generally the participants’ behavior. In contrast, Market Design uses theory, empirical and experimental work to design markets which incentivize their participants in a way that leads to a "desirable" outcome. In this, the designer can have different objectives, for example: Maximizing efficiency, welfare or minimizing negative externalities.

Prominent applications of Market Design include, quite topical, Germany's auction of 5G mobile licenses and matching markets, where there are two large populations that need to be matched to one another (think of hospitals and interns, students and dorm rooms or kidney donors and receivers). In this seminar, we think about ways to either design new markets or how we could alter existing ones in a socially beneficial way. Alternatively, research ideas could focus on finding failures or shortcomings of ineffectively designed markets.

Notes
For Master students of the fields Industrial Engineering and Management, Information Engineering and Management, Economics Engineering or Economathematics.

Objective: The student develops an own idea for an economic experiment in this research direction. Students work in groups. Changing topics each semester. For current topics, see http://polit.econ.kit.edu or https://portal.wiwi.kit.edu/Seminare

The acceptance of students for the seminar is based on preferences and suitability for the topics. This includes theoretical and practical experience with Behavioral Economics as well as English skills.

Seminar Papers of 8–10 pages are to be handed in.

Students’ grades will be based on the quality of presentations in the seminar (40%) and the seminar paper (40%). Additionally students will have to hand in two abstracts with different lengths (20%). Students can improve their grades by actively participating in the discussions of the presentations.

Recommendation: Knowledge in the field of experimental economic research or behavioral economics as well as in the field of microeconomics and game theory may be helpful.

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.

Designing the Digital Economy, Topics on Political Economy (Bachelor)
2560556, SS 2020, 2 SWS, Language: English, Open in study portal
Workload
About 90 hours.

Designing the Digital Economy, Topics on Political Economy (Master)
2560557, SS 2020, 2 SWS, Language: English, Open in study portal

Workload
About 90 hours.
## 6.255 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

### Responsible:
Professorenschaft des Fachbereichs Informatik

### Organisation:
KIT Department of Economics and Management

### Part of:
M-INFO-102822 - Seminar Module Informatics

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<td>Linked Data and the Semantic Web</td>
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<td>WS 19/20</td>
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<td>WS 19/20</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:

Security and Privacy Awareness
2400125, WS 19/20, 2 SWS, Open in study portal

Notes
Within the framework of this interdisciplinary seminar, the topics security awareness and privacy awareness are to be considered from different perspectives. It deals with legal, information technology, psychological, social as well as philosophical aspects.

Dates:
- Kick-Off (with topic placing): 25.10.19, 11:30-13:00 Building 5.20 Room 1C-01
- Final version: 10.03.20
- Presentation: 25.03.20

Topics will be assigned at the Kick-Off.

Topics:
- Mass surveillance of communication nodes and chilling effects - a legal and ethical debate (Supervisor: Prof. Seidel, Prof. Boehm, Gottschalk)
- Ethical analysis of so-called attack studies in the context of the survey of security awareness (Supervisor: Prof. Seidel, Prof. Volkamer)
- Privacy awareness in the context of Alexa and Co. (Supervisor: Prof. Boehm, Gottschalk, Prof. Volkamer, Aldag)
- Security awareness in the context of 2 factor authentication when paying with credit cards on the Internet (Supervisor: Prof. Volkamer, Aldag)
- What is the worth of privacy? (Supervisor: Prof. Seidel)
- Processing Social Media Content for Law Enforcement (Supervisor: Prof. Boehm, Gottschalk)

ATTENTION: The seminar is only for MASTER students!

Linked Data and the Semantic Web
2512301, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Information Engineering and Management M.Sc.
Module Handbook as of 18.02.2020
Notes
Linked Data is a way of publishing data on the web in a machine-understandable fashion. The aim of this practical seminar is to build applications and devise algorithms that consume, provide, or analyse Linked Data.

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

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

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. 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.

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Real-World Challenges in Data Science and Analytics
2512311, WS 19/20, 3 SWS, Language: German/English, Open in study portal

Notes
In the seminar, various Real-World Challenges in Data Science and Analytics will be worked on.

During this seminar, groups of students work on a case challenge with data provided. Here, the typical process of a data science project is depicted: integration of data, analysis of these, modeling of the decisions and visualization of the results.

During the seminar, solution concepts are worked out, implemented as a software solution and presented in an intermediate and final presentation. The seminar "Real-World Challenges in Data Science and Analytics" is aimed at students in master's programs.

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

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Cognitive Automobiles and Robots
2513500, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Notes
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.
Seminar Service Science, Management & Engineering

Notes
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis (15-20 pages), a presentation and active participation in class.

The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Learning objectives:
The student
- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.

Recommendations:
Lecture eServices [2595466] is recommended.

Workload:
The total workload for this course is approximately 90 hours. For further information see German version.

Seminar Knowledge Discovery and Data Mining (Master)

Notes
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.

Seminar Data Science & Real-time Big Data Analytics (Master)

Notes
In this practical seminar, students will design applications in teams that use meaningful and creative Event Processing methods. Thereby, students have access to an existing record.

Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term “Big Data”. The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

Further information to the practical seminar is given under the following Link:
http://seminar-cep.fzi.de

Questions are answered via the e-mail address sem-ep@fzi.de.
Cognitive Automobiles and Robots
2513500, SS 2020, 2 SWS, Language: German/English, Open in study portal

Notes
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.

Seminar Service Science, Management & Engineering
2595470, SS 2020, 2 SWS, Language: German, Open in study portal

Notes
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.
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-102736 - Seminar Module Economic Sciences

### Events

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<td>2550473</td>
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<td>2550491</td>
<td>Seminar: Modern OR and Innovative Logistics</td>
<td>2 SWS</td>
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<td>Seminar on Power Systems Optimization (Master)</td>
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### Exams

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<td>WS 19/20</td>
<td>7900156</td>
<td>Modern OR and Innovative Logistics</td>
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<td>WS 19/20</td>
<td>7900212</td>
<td>Real-World Challenges in Data Science und Analytics</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.

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

**Seminar: Modern OR and Innovative Logistics**
- Event Code: 2550491, WS 19/20, 2 SWS, Language: German, [Open in study portal](#)
Notes
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.

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

Seminar: Modern OR and Innovative Logistics
2550491, SS 2020, 2 SWS, Language: German, Open in study portal

Notes
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.

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.
### 6.257 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-102736 - Seminar Module Economic Sciences

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**Events**

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<th>SS 2020</th>
<th>2521310</th>
<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

**Annotation**  
The course will be offered in English.
Below you will find excerpts from events related to this course:

**Seminar: Neuronale Netze und künstliche Intelligenz**

WS 19/20, 2400078, SWS, Language: German/English, Open in study portal

**Notes**

In many tasks that appear natural to us, the fastest computers are unable to match the performance of the human brain. Neural networks attempt to simulate the parallel and distributed architecture of the brain in order to master these skills with learning algorithms. In this context, focus is being put on neural network approaches to computer vision and speech recognition, robotics and other areas.

In this seminar students will acquaint themselves with literature from provided topics and will present their results as a talk supported by slides to the other participants of the seminar.

**Recommendations:**

- Finishing the module "Kognitive Systeme" prior to the seminar is recommended.
- Attending the lecture "Deep Learning und Neuronale Netze" prior to the seminar is of advantage.
**Hot Topics in Bioinformatics**

2400011, SS 2020, 2 SWS, Language: English, Open in study portal

Notes

**Prerequisites:** CS Master’s level seminar. Participants must have attended and passed the course on "Introduction to Bioinformatics for Computer Scientists" in one of the preceding winter terms.

**Task:** You will need to select papers to present, give a presentation and write a report.

This main seminar allows students to understand and present the contents of current papers in Bioinformatics such as published for instance in the journals *Bioinformatics*, *BMC Bioinformatics*, *Journal of Computational Biology*, etc. or at conferences such as ISMB or RECOMB.

We will provide a list of interesting papers, but students can also propose papers they are interested in. Students may also chose to cover broader topics of more general interest such as multiple sequence alignment, Bayesian phylogenetic inference, read assembly etc.

Each student will be assigned a lab member for help with understanding the article and preparing the slides as well as the report.

Students should give a 35 minute presentation on their topic of choice and write a report (Seminararbeit) comprising 8 pages.

**Goals:** Participants are able to understand, critically assess, and compare current research papers in Bioinformatics. They are able to present algorithms and models from current research papers in oral and written form at a level that corresponds to that of scientific publications and conference presentations. Participants are able to suggest extension to current methods.

**Credits:** 3 ECTS

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**Advanced Methods of Information Fusion**

24344, SS 2020, 2 SWS, Language: German/English, Open in study portal

Learning Content

- The students will research selected theoretical works of the field of information fusion and data analysis, and present the results to their colleagues.
- The Seminar will prepare the students to write their Master thesis.
- Moreover, the students will learn to work with LaTeX and Powerpoint.
### 6.259 Course: Seminar: Computer Science TECO [T-INFO-110808]

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<tr>
<th>Responsible:</th>
<th>Prof. Dr.-Ing. Michael Beigl</th>
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<td>Each term</td>
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<td><strong>Version</strong></td>
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### 6.260 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>Governance, Risk &amp; Compliance</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
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# T 6.261 Course: Seminar: Legal Studies I [T-INFO-101997]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101218 - Seminar Module Law  
- M-INFO-102233 - Further Examinations

### Events

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<td>SS 2020</td>
<td>Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung</td>
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<td>Seminar (S)</td>
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<td>SS 2020</td>
<td>Current Issues in Patent Law</td>
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### Exams

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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](#)

**Notes**  
Registration via [https://portal.wiwi.kit.edu/ys/2708](https://portal.wiwi.kit.edu/ys/2708)
6.262 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
- M-WIWI-103117 - Data Science: Data-Driven Information Systems

### Table

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**Exams**

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**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:**

**Learning Content**

Today's service-oriented companies are starting to optimize the way services are planned, operated, and personalized by analyzing vast amounts of data from customers, IT-systems, or sensors. As the statistical learning and business optimization world continues to progress, skills and expertise in advanced data analytics and data and fact-based optimization become vital for companies to be competitive. In this lecture, relevant methods and tools will be considered as a package, with a strong focus on their inter-relations. Students will learn to analyze and structure large amounts of potentially incomplete and unreliable data, to apply multivariate statistics to filter data and to extract key features, to predict future behavior and system dynamics, and finally to formulate data and fact-based service planning and decision models.

More specifically, the lessons of this lecture will include:

- Co-Creation of Value Across Enterprises
- Instrumentation, Measurement, Monitoring of Service Systems
- Descriptive, predictive, and prescriptive Analytics
- Usage Characteristics and Customer Dynamics
- Big Data, Dimensionality Reduction, and Real-Time Analytics
- System Models and What-If-Analysis
- Robust Mechanisms for Service Management
- Industry Applications of Service Analytics

**Tutorials**

Students will conduct lecture accompanying, guided exercises throughout the semester.
Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
- An Introduction to Statistical Learning with Applications in R, James, G. et al., Springer, 2013.

Paper:
- Business Intelligence and Analytics: from Big Data to Big Impact, Chen, H. et al., MIS quarterly, 2012.

Further readings will be provided in the lecture.
6.263 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).
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.
6.264 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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**Exams**

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<td>Prüfung (PR)</td>
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**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)**

**Description**

While innovation in manufacturing or agriculture can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice - while many organizations have a well-understood process for innovating in the product business - innovating in services is often still a fuzzy and complex undertaking.

In this lecture we will:

- discuss the state of research
- compare product and service innovation
- understand how innovation diffusion works
- examine case studies of service innovation
- compare open vs. closed innovation
- learn how to leverage user communities to drive innovation and
- understand obstacles, and enablers and how to manage, incentivize and foster service innovation

**Learning Content**

While innovation in manufacturing can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice, while many organizations have a well-understood process for innovating in the product business, innovating in services is often still a fuzzy and complex undertaking. In this lecture we will discuss the state of research, compare product and service innovation and understand how innovation diffusion works. We examine case studies on service innovation, compare open vs. closed innovation and learn how to apply different innovation tools, methods and strategies (e.g. service design thinking as a human-centered approach to innovation or technology and strategic foresight, as methods supporting the generation of assumptions on the impact of technology).
**Workload**
Total workload: approximately 136 hours
Attendance time: 30 hours
Self-study: 105 hours

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

**Notes**
In this lecture, bounds for codes (Hamming, Gilbert-Varshamov, Singleton) are presented. Coding and decoding for classical algebraic codes (linear, cyclic, Reed Solomon-, Goppa- und Reed Muller-codes) will be presented as well as concatenated codes.

**Learning Content**
The course covers essentially the question of how the exchange of information can be realized reliably and efficiently. The lecture gives an overview of how to secure signals against random errors. In signal theory, source coding and the Theorem of Shannon will be covered. In the coding theory part, bounds for codes (Hamming, Gilbert-Varshamov, Singleton) are presented. Coding and decoding for classical algebraic codes (linear, cyclic, Reed Solomon-, Goppa- und Reed Muller-codes) will be presented as well as concatenated codes.
**6.266 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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**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:*

**Notes**

- 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.

**Learning Content**

- Introduction
- Agents and market places in the electricity industry
- Selected planning tasks of energy service companies
- Methods of modelling in the energy sector
- Agent-based simulation: The PowerACE model
- Simulation game: Simulation in energy economics (electricity and emission trading, investment decisions)

The lecture is structured in a theoretical and a practical part. In the theoretical part, the students are taught the basics to carry out simulations themselves in the practical part which comprises amongst others the simulation of the power exchange. The participants of the simulation game take a role as a power trader in the power market. Based on various sources of information (e.g. prognosis of power prices, available power plants, fuel prices), they can launch bids in the power exchange.
Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:
6.267 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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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


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Notes

- 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
6.268 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

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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.
6.269 Course: Social Choice Theory [T-WIWI-102859]

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

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

**Part of:**
- M-WIWI-101500 - Microeconomic Theory
- M-WIWI-101504 - Collective Decision Making

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**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

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

### Social Choice Theory

**2520537, SS 2020, 2 SWS, Language: English, Open in study portal**

**Learning Content**
The course provides a comprehensive treatment of preference and judgement aggregation, including proofs of general results that have Arrow's famous impossibility theorem and Gibbard's oligarchy theorem as corollaries. The second part of the course is devoted to voting theory. Among other things, we prove the Gibbard-Satterthwaite theorem.

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

**Literature**

**Main texts:**

**Secondary texts:**
### Course: Sociotechnical Information Systems Development [T-WIWI-109249]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-104403 - Critical Digital Infrastructures

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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.

**Notes**

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

**Sociotechnical Information Systems Development**

2512400, WS 19/20, 3 SWS, Language: German/English, [Open in study portal]

**Practical course (P)**

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
**6.271 Course: Software Architecture and Quality [T-INFO-101381]**

**Responsible:** Prof. Dr. Ralf Reussner  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101201 - Software Systems  
- M-INFO-101202 - Software Methods  
- M-INFO-102233 - Further Examinations

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6.272 Course: Software Quality Management [T-WIWI-102895]

**Responsible:** Prof. Dr. Andreas Oberweis

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

**Part of:** M-WIWI-101477 - Development of Business Information Systems

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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**

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**Notes**
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 software 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
6.273 Course: Software-Evolution [T-INFO-101256]

**Responsible:** Prof. Dr. Ralf Reussner

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101201 - Software Systems
- M-INFO-101202 - Software Methods
- M-INFO-102233 - Further Examinations

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6.274 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

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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 19/20, 2 SWS, Language: English, Open in study portal
Notes
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).
6.275 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-101506 - Service Analytics

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**Exams**

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<td>7900263</td>
<td>Special Topics in Information Systems</td>
<td>Prüfung (PR)</td>
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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.
6 COURSES

Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

Responsible: apl. Prof. Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

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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:

Statistical Modeling of Generalized Regression Models

2521350, WS 19/20, 2 SWS, Open in study portal

Notes

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

Annotation

Knowledge of the contents covered by the course “Economics III: Introduction in Econometrics” [2520016]

Workload:
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours
6.277 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 19/20, 2 SWS, Language: English, [Open in study portal](#)

**Lecture (V)**

**Description**

The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:


Notes

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

Learning Content

The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:


Stochastic processes (Poisson-process, Brownian motion, martingales), stochastic integral (integral, quadratic und co-variation, Ito-formula), stochastic differential equation for price-processes, trading strategies, option pricing(Feynman-Kac), neutral risk rating(equivalent martingale measure, Girsanov theorem), term structure models

Workload

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

Literature

To be announced in lecture.

Elective literature:

- An Introduction to Stochastic Integration (Probability and Its Applications) by Kai L. Chung, Ruth J. Williams, Birkhauser, 1990
- Methods of Mathematical Finance by Ioannis Karatzas, Steven E. Shreve, 1998
6.278 Course: Strategic Finance and Technology Change [T-WIWI-110511]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2

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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.
### 6.279 Course: Strategic Management of Information Technology [T-WIWI-102669]

**Responsible:** Thomas Wolf  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101477 - Development of Business Information Systems

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**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
Responsibility: 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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Exams

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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:
Notes
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.

Learning Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a
Notes
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.

Learning Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a
Course: Subdivision Algorithms [T-INFO-103550]

**Responsible:** Prof. Dr. Hartmut Prautzsch

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101214 - Algorithms in Computer Graphics
- M-INFO-101864 - Subdivision Algorithms
- M-INFO-102233 - Further Examinations

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Module Handbook as of 18.02.2020

554
6.282 Course: Supplement Enterprise Information Systems [T-WIWI-110346]

**Responsible:** Prof. Dr. Andreas Oberweis

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

**Part of:** M-WIWI-101477 - Development of Business Information Systems

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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
## 6.283 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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| Exams        |          | Supply Chain Management in the  |         |
|--------------|----------| Automotive Industry              |         |
| WS 19/20     | 7981957  | Prüfung (PR)                     | Schultmann |

**Competence Certificate**  
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

**Prerequisites**  
None

**Recommendation**  
None

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

### Supply Chain Management in the automotive industry

**2581957, WS 19/20, 2 SWS, Language: German, Open in study portal**

**Notes**
- 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
Learning Content

- Automotive industry significance
- The automotive supply chain
- Adding value structures of the automotive supply chain and mastering of the production systems as factors of success in the SCM
- Strategic procurement logistics
- Risk management
- Quality engineering and management in the automotive supply chain
- Cost engineering and management in the automotive supply chain
- Purchasing (Supplier selection, contract management)
- Performance measurement of the supply chain / organization

Annotation
None.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be announced in the course.
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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**Exams**

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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.

**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)
Notes
This lecture deals with supply chain management from a practitioner’s perspective with a special emphasis on 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

Learning Content
1. Introduction to Supply Chain Management
   1.1. Supply Chain Management Fundamentals
   1.2. Supply Chain Management Analytics
2. Structure of Advanced Planning Systems
3. SAP SCM
   3.1. Introduction / SCM Solution Map
   3.2. Demand Planning
   3.3. Supply Network Planning
   3.4. Production Planning and Detailed Scheduling
   3.5. Deployment
   3.6. Transportation Planning and Vehicle Scheduling
   3.7. [Optional] Global Available to Promise
4. SAP SCM in Practice
   4.1. Success Stories
   4.2. SAP Implementation Methodology

Annotation
This lecture has 3.5 Credits since summer term 2014.

Workload
The total workload for this course is approximately 105 hours. For further information see German version.

Literature
will be announced in the course
6.285 Course: Symmetric Encryption [T-INFO-101390]

Responsible: Prof. Dr. Jörn Müller-Quade
Organisation: KIT Department of Informatics
Part of: M-INFO-101198 - Advanced Topics in Cryptography
M-INFO-101207 - Networking Security - Theory and Praxis
M-INFO-102233 - Further Examinations

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Events

| SS 2020 | 24629 | Symmetric encryption | 2 SWS | Lecture (V) | Müller-Quade, Geiselmann |

Exams

| WS 19/20 | 7500178 | Symmetric Encryption | Prüfung (PR) | Geiselmann, Müller-Quade |

Competence Certificate
Es wird empfohlen, das Modul Sicherheit zu belegen.

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

**Symmetric encryption**
24629, SS 2020, 2 SWS, Language: German, Open in study portal

Learning Content
This lecture provides the theoretical and practical aspects of symmetric cryptography. The most important topics are:

- Historical ciphers, if they are useful for assessing the security of current ciphers,
- block ciphers and the most important types of attacks (differential and linear cryptanalysis, meet-in-the-middle attacks, slide attacks),
- hash functions - the focus is on attacks and techniques to forge meaningful messages through the use of "meaningless collisions",
- security definitions for symmetric encryption schemes and their modes of operation.
## 6.286 Course: Tax Law I [T-INFO-101315]

### Responsible:
Prof. Dr. Thomas Dreier

### Organisation:
KIT Department of Informatics

### Part of:
- M-INFO-101216 - Private Business Law
- M-INFO-102233 - Further Examinations

### Type
Written examination

### Credits
3

### Recurrence
Each winter term

### Version
1

### Events

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## 6.287 Course: Tax Law II [T-INFO-101314]

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

**Organisation:**  
KIT Department of Informatics  

**Part of:**  
M-INFO-101216 - Private Business Law  
M-INFO-102233 - Further Examinations  

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6.288 Course: Technologies for Innovation Management [T-WIWI-102854]

**Responsible:** Dr. Daniel Jeffrey Koch

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

**Part of:**
- M-WIWI-101507 - Innovation Management
- M-WIWI-101507 - Innovation Management

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**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:**

**Notes**

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.

**Learning Content**

The seminar “Technologies for Innovation Management” will focus on the early phase or fuzzy front end in innovation management. Technologies can be of great importance here, above all in the supply of information. In globally distributed R & D organizations, it is necessary to collect as much information as possible on new technological developments in the early phase of the innovation process. Information and communication technologies can be supported.

**Literature**

Will be announced in the first session.
6.289 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

Type: Examination of another type
Credits: 3
Recurrence: see Annotations
Version: 1

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Competence Certificate
Alternative exam assessment.

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

Annotation
See German version.
**6.290 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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**Competence Certificate**  
Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

**Prerequisites**  
None

**Recommendation**  
Basic knowledge and skills of microeconomics from undergraduate studies (bachelor’s degree) are expected. Particularly helpful but not necessary: Industrial Economics. Prior attendance of the lecture „Competition in Networks“ [26240] or "Industrial Organisation" is helpful in any case but not considered a formal precondition. The English taught course "Communications Economics" is complementary and recommendet for anyone interested in the sector.

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

**Telecommunication and Internet Economics**  
2561232, WS 19/20, 2 SWS, Language: German, [Open in study portal]

**Learning Content**  
Among the network sectors the telecommunication and internet sector is the most dynamic one and the one with and highest variety of phenomena. Problems of natural monopoly still exist in some parts. But there is also competition, not only at the service level but also at the infrastructural level. Both levels are characterized by (vertical) quality differentiations and by high technology dynamics. What should the regulation of this sector look like? How should the mutual network access prices of two telecommunication providers be regulated and how can regulators set incentives for infrastructure investments? The internet is a free market par excellence, because everybody can open internet businesses without high entry costs. Why then can a company like ebay dominate the market for internet-auction platforms so strongly? The causes of market concentration on the internet will be analyzed. So will be the economic implications of the Next Generations Networks.

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

**Literature**  

Further literature will be provided during the lecture.
### T 6.291 Course: Telecommunications Law [T-INFO-101309]

**Responsible:** Prof. Dr. Nikolaus Marsch  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101217 - Public Business Law  
- M-INFO-102233 - Further Examinations

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6.292 Course: Telematics [T-INFO-101338]

**Responsible:** Prof. Dr. Martina Zitterbart

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100801 - Telematics
- M-INFO-101205 - Future Networking
- M-INFO-101206 - Networking
- M-INFO-102233 - Further Examinations

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

### Telematics

**24128, WS 19/20, 3 SWS, Language: German, Open in study portal**

**Description**

The lecture covers (i.a.) protocols, architectures, as well as methods and algorithms, for routing and establishing reliable end-to-end connections in the Internet. In addition to various methods for media access control in local area networks, the lecture also covers other communication systems, e.g. circuit-switched systems such as ISDN. Participants should also have understood the possibilities for managing and administering networks.
Notes
The lecture covers (i.a.) protocols, architectures, as well as methods and algorithms, for routing and establishing reliable end-to-end connections in the Internet. In addition to various methods for media access control in local area networks, the lecture also covers other communication systems, e.g. circuit-switched systems such as ISDN. Participants should also have understood the possibilities for managing and administering networks.

Familiarity with the contents of the lecture Einführung in Rechnernetze or comparable lectures is assumed.

Learning Objectives
After attending this lecture, the students will

- have a profound understanding of protocols, architectures, as well as procedures and algorithms used for routing and for establishing reliable end-to-end connections in the Internet
- have a profound understanding of different media access control procedures in local networks and other communication systems like circuit-switched ISDN
- have a profound understanding of the problems that arise in large scale dynamic communication systems and are familiar with mechanisms to deal with these problems
- be familiar with current developments such as SDN and data center networking
- be familiar with different aspects and possibilities for network management and administration

Students have a profound understanding of the basic protocol mechanisms that are necessary to establish reliable end-to-end communication. Students have detailed knowledge about the congestion and flow control mechanisms used in TCP and can discuss fairness issues in the context of multiple parallel transport streams. Students can analytically determine the performance of transport protocols and know techniques for dealing with specific constraints in the context of TCP, e.g., high data rates and low latencies. Students are familiar with current topics such as the problem of middle boxes on the Internet, the usage of TCP in data centers or multipath TCP. Students are also familiar with practical aspects of modern transport protocols and know practical ways to overcome heterogeneity in the development of distributed applications.

Students know the functions of (Internet) routing and routers and can explain and apply common routing algorithms. Students are familiar with routing architectures and different alternatives for buffer placement as well as their advantages and disadvantages. Students understand the classification into interior and exterior gateway protocols and have in-depth knowledge of the functionality and features of common protocols such as RIP, OSPF, and BGP. Students are also familiar with current topics such as label switching, IPv6 and SDN.

Students know the function of media access control and are able to classify and analytically evaluate different media access control mechanisms. Students have an in-depth knowledge of Ethernet and various Ethernet variants and characteristics, which especially includes current developments such as real-time Ethernet and data center Ethernet. Students can explain and apply the Spanning Tree Protocol.

Students know the architecture of ISDN and can reproduce the peculiarities of setting up the ISDN subscriber line. Students are familiar with the technical features of DSL.
6.293 Course: The negotiation of open innovation [T-WIWI-110867]

**Responsible:** Dr. Daniela Beyer
**Organisation:** KIT Department of Economics and Management

**Events**

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**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:*

**Notes**
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: 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

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Events
- WS 19/20 2561503 Theory of endogenous growth 2 SWS Lecture (V) Ott
- WS 19/20 2561504 Theory of endogenous growth 1 SWS Practice (Ü) Ott, Eraydin

Exams
- WS 19/20 7900078 Theory of Endogenous Growth Prüfung (PR) Ott

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
2561503, WS 19/20, 2 SWS, Language: German/English, Open in study portal

Lecture (V)
Notes
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.

Learning Content
- Basic models of endogenous growth
- Human capital and economic growth
- Modelling of technological progress
- Diversity Models
- Schumpeterian growth
- Directional technological progress
- Diffusion of technologies

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

Literature
Excerpt:
6.295 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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**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.
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
- M-INFO-102233 - Further Examinations

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<td>Trademark and Unfair Competition Law</td>
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### Course: Transport Economics [T-WIWI-100007]

**Responsible:** Prof. Dr. Kay Müttsch  
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

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<td>2560230</td>
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<td>Übung zu Transportökonomie</td>
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**Competence Certificate**
The assessment is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

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

**Transport Economics**  
2560230, SS 2020, SWS, Language: German, [Open in study portal](#)

**Learning Content**
The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticians and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport  
- empirical analysis of transport demand  
- assessment of transport infrastructure projects  
- external effects in transport  
- transport policy  
- cost structures of transport infrastructure  
- Project evaluation from the perspective of the public sector

**Workload**
The total workload for this course is approximately 135.0 hours. For further information see German version.
Literature
Will be announced in the lecture.
(for literature to prepare the lecture - see additional literature)

Literature:
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<td>Each winter term</td>
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Course: Valuation [T-WIWI-102621]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101482 - Finance 1
- M-WIWI-101483 - Finance 2
- M-WIWI-101510 - Cross-Functional Management Accounting

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**Competence Certificate**
See German version.

**Prerequisites**
None

**Recommendation**
None

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

**Valuation**
2530212, WS 19/20, 2 SWS, Language: English, [Open in study portal]

**Description**

Firms prosper when they create value for their shareholders and stakeholders. This is achieved by investing in projects that yield higher returns than their according cost of capital. Students are told the basic tools for firm and project valuation as well as ways to implement these tools in order to enhance a firm’s value and improve its investment decisions. Among other things, the course will deal with the valuation of firms and individual projects using discounted cash flow and relative valuation approaches and the valuation of flexibility deploying real options.

**Learning Content**

**Topics:**
- Projections of cash flows
- Estimation of the cost of capital
- Valuation of the firm
- Mergers and acquisitions
- Real options

**Literature**

**Elective Literature**

6.300 Course: Wearable Robotic Technologies [T-INFO-106557]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour  
Prof. Dr.-Ing. Michael Beigl

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-103294 - Wearable Robotic Technologies

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**Exams**

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

**Wearable Robotic Technologies**

2400062, SS 2020, 2 SWS, Language: German/English, [Open in study portal]

**Lecture (V)**

**Notes**

The lecture starts with an overview of wearable robot technologies (exoskeletons, prostheses and orthoses) and its potentials, followed by the basics of wearable robotics. In addition to different approaches to the design of wearable robots and their related actuator and sensor technology, the lecture focuses on modeling the neuromusculoskeletal system of the human body and the physical and cognitive human-robot interaction for tightly coupled hybrid human-robot systems. Examples of current research and various applications of lower, upper and full body exoskeletons as well as prostheses are presented.

**Learning Objectives:**

The students have received fundamental knowledge about wearable robotic technologies and understand the requirements for the design, the interface to the human body and the control of wearable robots. They are able to describe methods for modelling the human neuromusculoskeletal system, the mechatronic design, fabrication and composition of interfaces to the human body. The students understand the symbiotic human–machine interaction as a core topic of Anthropomatics and have knowledge of state of the art examples of exoskeletons, orthoses and prostheses.

**Learning Content**

The lecture starts with an overview of wearable robot technologies (exoskeletons, prostheses and orthoses) and its potentials, followed by the basics of wearable robotics. In addition to different approaches to the design of wearable robots and their related actuator and sensor technology, the lecture focuses on modeling the neuromusculoskeletal system of the human body and the physical and cognitive human-robot interaction for tightly coupled hybrid human-robot systems. Examples of current research and various applications of lower, upper and full body exoskeletons as well as prostheses are presented.

**Workload**

120h
### 6.301 Course: Web Applications and Service-Oriented Architectures (II) [T-INFO-101271]

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<th>Responsible</th>
<th>Prof. Dr. Sebastian Abeck</th>
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6.302 Course: Web Science [T-WIWI-103112]

**Responsible:** Prof. Dr. York Sure-Vetter

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

**Part of:**
- M-WIWI-101455 - Web Data Management
- M-WIWI-101457 - Semantic Technologies
- M-WIWI-102827 - Service Computing
- M-WIWI-105368 - Web and Data Science

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 2

**Events**

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**Exams**

- Prüfung (PR)

**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:*

**Web Science**

- 2511312, WS 19/20, 2 SWS, Language: English, [Open in study portal](#)
Notes
The lecture provides insights into the analysis of social networks and the used metrics. Thereby, in particular, web phenomena and the available technologies are considered.

Web Science is the emergent study of the people and technologies, applications, processes and practices that shape and are shaped by the World Wide Web. Web Science aims to draw together theories, methods and findings from across academic disciplines, and to collaborate with industry, business, government and civil society, to develop our knowledge and understanding of the Web: the largest socio-technical infrastructure in human history.

The lecture provides an introduction to basic concepts of Web Science. Essential theoretical foundations, phenomena and approaches are presented and explained.

This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Learning objectives:
The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.

Workload:

- The total workload for this course is approximately 135 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 60 hours
- Exam and exam preparation: 30 hours

Exercises to Web Science
2511313, WS 19/20, 1 SWS, Language: English, Open in study portal

Notes
The exercises are related to the lecture Web Science.

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

This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Learning objectives:
The students

- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.
### 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 19/20, 2 SWS, Language: German, Open in study portal
Notes
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.

Learning Content
In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

Annotation
This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

Workload
The total workload for this course is approximately 90 hours.
Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a
6.304 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 (S)</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
Notes
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.

Learning Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

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

Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a