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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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+49 721 608-44031
 bachelor@wirtschaftsinformatik.kit.edu

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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](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/](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](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

for master students

Personal consultation: KIT Department of Economics and Management, Examination Office Gebäude am Kronenplatz Building 05.20, 3rd floor, Room 3C-05 master@wirtschaftsinformatik.kit.edu

editorial responsibility:

Dr. André Wiesner, KIT Department of Economics and Management Phone: +49 721 608-44061 modul@wiwi.kit.edu
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.
## 3 The Master’s Degree Program in Information Engineering and Management

### Structure of the Master’s degree program in Information Engineering and Management SPO 2015

<table>
<thead>
<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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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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**Election block: Informatik (at least 33 credits)**

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<td>M-WIWI-101477</td>
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<td>Lab Course: Natural Language Processing and Software Engineering</td>
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<td>Practical Course: Database Systems</td>
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<td>M-INFO-101663</td>
<td>Practical Course: Analyzing Big Data</td>
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<td>M-INFO-103294</td>
<td>Wearable Robotic Technologies</td>
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<td>Data Privacy: From Anonymization to Access Control</td>
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<td>M-WIWI-103243 Optimization under Uncertainty in Information Engineering and Management</td>
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**Election block: Wahlmodule WIWI (9 credits)**

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<td>Management Accounting</td>
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<td>M-WIWI-101514</td>
<td>Innovation Economics</td>
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<td>Data Science for Finance</td>
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<td>M-WIWI-105036</td>
<td>FinTech Innovations</td>
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<td>M-WIWI-101470</td>
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<td>M-WIWI-101409</td>
<td>Electronic Markets</td>
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<td>M-WIWI-101446</td>
<td>Market Engineering</td>
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<td>M-WIWI-101448</td>
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<td>Industrial Production II</td>
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<td>Disruptive FinTech Innovations</td>
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<td>eEnergy: Markets, Services and Systems</td>
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<td>Information Systems in Organizations</td>
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<td>Cross-Functional Management Accounting</td>
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# 4 FIELD OF STUDY STRUCTURE

## Law

### 4.4 Law

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<td>M-INFO-101216</td>
<td>Private Business Law</td>
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<td>M-INFO-101217</td>
<td>Public Business Law</td>
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<td>M-WIWI-102736</td>
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5 Modules

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

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

<table>
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<th>Level</th>
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<td>2 semester</td>
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Election block: Design and Analysis / Engineering and Applications (at least 1 item as well as at least 9 credits)

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<td>T-INFO-101334</td>
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<td>5 CR</td>
<td>Worsch</td>
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<tr>
<td>T-INFO-101331</td>
<td>Randomized Algorithms</td>
<td>5 CR</td>
<td>Worsch</td>
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<tr>
<td>T-INFO-101333</td>
<td>Parallel Algorithms</td>
<td>5 CR</td>
<td>Sanders</td>
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<tr>
<td>T-INFO-103334</td>
<td>Algorithmic Methods for Hard Optimization Problems</td>
<td>5 CR</td>
<td>Wagner</td>
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<tr>
<td>T-INFO-104390</td>
<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>T-INFO-101332</td>
<td>Algorithm Engineering</td>
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<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

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

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

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<td>Algorithm Engineering</td>
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<td>Parallel Algorithms</td>
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<td>Laboratory Course Algorithm Engineering</td>
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<td>Sanders, Wagner</td>
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<td>T-INFO-104390</td>
<td>Algorithms for Visualization of Graphs</td>
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<td>T-INFO-101331</td>
<td>Randomized Algorithms</td>
<td>5 CR</td>
<td>Worsch</td>
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Competence 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: Fortgeschrittene Themen der Kryptographie (at least 1 item as well as at least 9 credits)

<table>
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<td>T-INFO-101360</td>
<td>Signals and Codes</td>
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<td>T-INFO-101260</td>
<td>Asymmetric Encryption Schemes</td>
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<td>T-INFO-101390</td>
<td>Symmetric Encryption</td>
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<td>Müller-Quade</td>
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<td>T-INFO-101259</td>
<td>Provable Security in Cryptography</td>
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<td>T-INFO-101279</td>
<td>Cryptographic Voting Schemes</td>
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<td>T-INFO-101280</td>
<td>Digital Signatures</td>
<td>3 CR</td>
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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.
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 (Wahlmodule WIWI)

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

### Mandatory

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### Election block: Ergänzungsangebot (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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<td>T-WIWI-102739</td>
<td>Public Revenues</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 (Wahlmodule WIWI)
- Economics and Management (Wahlmodule BWL)

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

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

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<td>T-WIWI-106189</td>
<td>Workshop Business Wargaming – Analyzing Strategic Interactions</td>
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<td>T-WIWI-106190</td>
<td>Strategy and Management Theory: Developments and “Classics”</td>
<td>3</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

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

**Prerequisites**
None

**Content**
The module is divided into three main topics:

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

**Recommendation**
None

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

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

This module will be offered for the first time in the winter term 2017/18.
## 5.6 Module: Algorithm Engineering [M-INFO-100795]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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**Mandatory**

| T-INFO-101332 | Algorithm Engineering | 5 CR | Sanders, Wagner |
5.7 Module: Algorithmic Methods for Hard Optimization Problems [M-INFO-101237]

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

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**Mandatory**

| T-INFO-103334 | Algorithmic Methods for Hard Optimization Problems | 5 CR | Wagner |

**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:** Prof. Dr. Henning Meyerhenke
- **Organisation:** KIT Department of Informatics
- **Part of:** Informatics

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### Mandatory

| T-INFO-104759 | Algorithmic Methods for Network Analysis | 5 CR | Meyerhenke |

### 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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<td>Algorithms for Routing</td>
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# 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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Information Engineering and Management M.Sc.  
Module Handbook as of 22.08.2019
### 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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Information Engineering and Management M.Sc.  
Module Handbook as of 22.08.2019
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 (Wahlmodule WIWI)

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<td>Machine Learning 2 – Advanced Methods</td>
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**Election block: Ergänzungsangebot (between 4.5 and 5 credits)**

**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.

- **Responsible:** Prof. Dr. Johannes Philipp Reiß
- **Organisation:** KIT Department of Economics and Management
- **Part of:** Economics and Management (Wahlmodule WIWI)

**Credits:** 9  **Language:** Deutsch/Englisch  **Level:** 4  **Version:** 3

### Election block: Ergänzungsangebot (between 1 and 2 items as well as at least 4.5 credits)

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### Competence Certificate

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

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

### Competence Goal

Students

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

### Prerequisites

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

### Content

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

### Recommendation

Basic knowledge in game theory is assumed.

### Annotation

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

The course "Decision Theory" [2520365] will not be offered any more from summer term 2015 on. The examination will be offered latest until winter term 2015/2016 (repeaters only).

### Workload

The total workload for this module is approximately 270 hours. For further information see German version.
5.15 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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# 5.16 Module: Automated Visual Inspection and Image Processing [M-INF-100826]

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

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**5.17 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: Autonome Robotik (at least 1 item as well as at least 9 credits)**

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<td>Robotics III - Sensors and Perception in Robotics</td>
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<td>Robotics II: Humanoid Robotics</td>
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**Prerequisites**

None
### Module: Big Data Analytics [M-INFO-100768]

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

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5.19 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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| T-INFO-105742 | Big Data Analytics 2 | 3 CR | Böhm |

Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
5.20 Module: Business & Service Engineering [M-WIWI-101410]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI) Economics and Management (Wahlmodule BWL)

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Election block: Wahlpflichtangebot (9 credits)

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**Competence Certificate**

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

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

**Competence Goal**

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.
5.21 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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5.22 Module: Collective Decision Making [M-WIWI-101504]

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

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Election block: Wahlpflichtangebot ()

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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.
5.23 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>Database Systems</td>
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<td>Introduction in Computer Networks</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
5.24 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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**Mandatory**

| T-INFO-103014 | Computational Complexity Theory, with a View Towards Cryptography | 6 CR | Hofheinz, Müller-Quade |
## 5.25 Module: Computational Geometry [M-INFO-102110]

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

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5.26 Module: Computer Security [M-INFO-101197]

**Responsible:** Prof. Dr. Jörn Müller-Quade

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

- **Credits:** 9
- **Recurrence:** Once
- **Duration:** 1 semester
- **Level:** 4
- **Version:** 2

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

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<tbody>
<tr>
<td>T-INFO-101371</td>
<td>Security</td>
<td>6 CR</td>
<td>Hofheinz, Müller-Quade</td>
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<td>T-INFO-101360</td>
<td>Signals and Codes</td>
<td>3 CR</td>
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<tr>
<td>T-INFO-101390</td>
<td>Symmetric Encryption</td>
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<tr>
<td>T-INFO-101279</td>
<td>Cryptographic Voting Schemes</td>
<td>3 CR</td>
<td>Müller-Quade</td>
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<tr>
<td>T-INFO-101260</td>
<td>Asymmetric Encryption Schemes</td>
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</tr>
</tbody>
</table>

**Competence Goal**

The student knows and understands the basic commonly used algorithms, their design, correctness and efficiency analysis, implementation, documentation and application, can handle new algorithmic problems, using this understanding, can apply the mathematical approaches learned in the basic computer science and mathematics courses to solve problems, deals with a restricted problem in the field of computer security within the seminar, analyzes and discusses the problems associated to a distinct discipline in the lectures and in the final seminar paper, discusses, presents and defends subject-specific arguments within a given task, organizes the preparation of the final papers largely independent.

**Prerequisites**

None

**Content**

Theoretical and practical aspects of computer security

- Development of safety goals and classification of threats
- Presentation and comparison of different formal access control models
- Formal description of authentication systems, presentation and comparison of different authentication methods (passwords, biometrics, challenge-response protocols)
- 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
- Block ciphers, hash functions, digital signature, public key encryption and digital signatures (RSA, ElGamal), and various methods of key exchange (e.g., Diffie-Hellman)
- Presentation of combinations of cryptographic modules using currently used protocols such as Secure Shell (SSH) and Transport Layer Security (TLS)

**Workload**

approx. 270h
5.27 Module: Context Sensitive Systems [M-INFO-100728]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

<table>
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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

Mandatory

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<td>Critical Information Infrastructures</td>
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<td>Sunyaev</td>
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Election block: Wahlpflichtangebot (at least 9 credits)

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<tr>
<td>T-WIWI-109246</td>
<td>Digital Health</td>
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<td>T-WIWI-110144</td>
<td>Emerging Trends in Digital Health</td>
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<td>T-WIWI-110143</td>
<td>Emerging Trends in Internet Technologies</td>
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<td>T-WIWI-109249</td>
<td>Sociotechnical Information Systems Development</td>
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<tr>
<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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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**Mandatory**

- T-WIWI-102885  Advanced Management Accounting  4,5 CR  Wouters

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

- T-WIWI-110179  Advanced Management Accounting 2  4,5 CR  Wouters
- T-WIWI-105777  Business Intelligence Systems  4,5 CR  Mädche, Nadj, Toreini
- T-WIWI-105781  Incentives in Organizations  4,5 CR  Nieken
- T-WIWI-102835  Marketing Strategy Business Game  1,5 CR  Klarmann
- T-WIWI-107720  Market Research  4,5 CR  Klarmann
- T-WIWI-102883  Pricing  4,5 CR  Feurer
- T-WIWI-109864  Product and Innovation Management  3 CR  Klarmann
- T-WIWI-102621  Valuation  4,5 CR  Ruckes
- T-WIWI-108651  Extraordinary additional course in the module Cross-Functional Management Accounting  4,5 CR  Wouters

**Competence Certificate**

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

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

**Competence Goal**

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

**Prerequisites**

The course "Advanced Management Accounting" is compulsory.

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

**Content**

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

**Recommendation**

None

**Annotation**

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

**Workload**

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

| T-INFO-108377 | Data Privacy: From Anonymization to Access Control | 3 CR | Böhm |

Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
Module: 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 (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

Credits 9  Language Englisch  Level 4  Version 1

### Mandatory

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<td>Computational Risk and Asset Management</td>
<td>6 CR</td>
<td>Ulrich</td>
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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 (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

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Election block: Wahlpflichtangebot (9 credits)

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<td>T-WIWI-109921</td>
<td>Advanced Machine Learning</td>
<td>4.5</td>
<td>Deutsch</td>
<td>Geyer-Schulz, Nazemi</td>
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<tr>
<td>T-WIWI-102762</td>
<td>Business Dynamics</td>
<td>4.5</td>
<td>Deutsch</td>
<td>Geyer-Schulz</td>
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<td>T-WIWI-103549</td>
<td>Intelligent CRM Architectures</td>
<td>4.5</td>
<td>Deutsch</td>
<td>Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102848</td>
<td>Personalization and Services</td>
<td>4.5</td>
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<td>T-WIWI-102847</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 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

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

Prerequisites
None

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

Recommendation
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
### 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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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**Election block: Wahlpflichtangebot ()**

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<td>T-WIWI-109863</td>
<td>Business Data Analytics: Application and Tools</td>
<td>4.5</td>
<td>Weinhardt</td>
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<td>T-WIWI-106187</td>
<td>Business Data Strategy</td>
<td>4.5</td>
<td>Weinhardt</td>
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<td>Mädche, Nadj, Toreini</td>
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<td>Practical Seminar: Data-Driven Information Systems</td>
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<td>Mädche, Setzer, Weinhardt</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]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

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

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<td>Dorner, Weinhardt</td>
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<td>T-WIWI-109863</td>
<td>Business Data Analytics: Application and Tools</td>
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**Competence Certificate**
The assessment is carried out as partial exams of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

**Competence Goal**
Students of this module

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

**Prerequisites**
None

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

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

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

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

**Recommendation**
Basic knowledge of Information Management, Operations Research, Descriptive Statistics, and Inferential Statistics is assumed.
### 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 (Wahlmodule WIWI)

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

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**Competence Certificate**

The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the 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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Mandatory

<p>| T-INFO-101306 | Datamanagement in the Cloud | 5 CR | Böhm |</p>
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<tr>
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<td>Deep Learning and Neural Networks</td>
<td>6</td>
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**Responsible:** Prof. Dr. Alexander Waibel  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics
5.38 Module: Deployment of Database Systems [M-INFO-100780]

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

<table>
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Mandatory

| T-INFO-101317 | Deployment of Database Systems | 5 CR | Böhm |

Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
## 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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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<td>Interactive Information Systems</td>
<td>4.5 CR</td>
<td>Mädche, Morana</td>
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**Election block: Ergänzungsangebot (at most 4.5 credits)**

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<td>Digital Service Design</td>
<td>4.5 CR</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.
Module: Development of Business Information Systems [M-WIWI-101477]

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

Part of: Informatics

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Election block: Wahlpflichtangebot (between 1 and 2 items)

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<td>Database Systems and XML</td>
<td>4,5</td>
<td>Oberweis</td>
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<td>T-WIWI-102895</td>
<td>Software Quality Management</td>
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<td>Oberweis</td>
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Election block: Ergänzungsangebot (at most 1 item)

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<td>Management of IT-Projects</td>
<td>4,5</td>
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<td>T-WIWI-102676</td>
<td>Special Topics of Enterprise Information Systems</td>
<td>4,5</td>
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<td>T-WIWI-102669</td>
<td>Strategic Management of Information Technology</td>
<td>4,5</td>
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<td>T-WIWI-103523</td>
<td>Advanced Lab Informatics</td>
<td>4,5</td>
<td>Oberweis, Sack, Sunyaev, Sure-Vetter, Volkmer, Zöllner</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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<tr>
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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 (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

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Election block: Wahlpflichtangebot (9 credits)

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<td>4,5</td>
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<td>T-WIWI-102822</td>
<td>Industrial Services</td>
<td>4,5</td>
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<td>T-WIWI-107043</td>
<td>Liberalised Power Markets</td>
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<td>T-WIWI-106200</td>
<td>Modeling and OR-Software: Advanced Topics</td>
<td>4,5</td>
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<td>T-WIWI-106201</td>
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<td>4,5</td>
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<td>Practical Seminar Digital Service Systems</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students

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

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

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

Recommendation
None

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

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

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:** Economics and Management (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

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

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<td>9 CR</td>
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<td>1.5 CR</td>
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<td>T-WIWI-106495</td>
<td>Automated Financial Advisory</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 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**

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

**Prerequisites**

None.

**Content**

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

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

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

**Recommendation**

None

**Annotation**

See respective lecture

**Workload**

The total workload for this module is approximately 270 hours. For further information, see respective lecture.
5.44 Module: Dynamic IT-Infrastructures [M-INFO-101210]

Responsible: Prof. Dr. Hannes Hartenstein
Organisation: KIT Department of Informatics
Part of: Informatics

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Election block: Dynamische IT-Infrastrukturen (at least 1 item as well as at least 9 credits)

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<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>
<td>5 CR</td>
<td>Beigl</td>
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<td>T-INFO-101276</td>
<td>Data and Storage Management</td>
<td>4 CR</td>
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<td>T-INFO-101284</td>
<td>Integrated Network and Systems Management</td>
<td>4 CR</td>
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<td>T-INFO-101298</td>
<td>Distributed Computing</td>
<td>4 CR</td>
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<td>T-INFO-101345</td>
<td>Parallel Computer Systems and Parallel Programming</td>
<td>4 CR</td>
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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.
5.45 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 (Wahlmodule WIWI)

**Credits** | **Recurrence** | **Language** | **Level** | **Version**
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9 | Each term | Deutsch | 4 | 3

**Mandatory**

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

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<td>4,5 CR</td>
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<tr>
<td>T-WIWI-103064</td>
<td>Financial Econometrics</td>
<td>4,5 CR</td>
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<td>T-WIWI-103126</td>
<td>Non- and Semiparametrics</td>
<td>4,5 CR</td>
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<td>T-WIWI-103127</td>
<td>Panel Data</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-103065</td>
<td>Statistical Modeling of Generalized Regression Models</td>
<td>4,5 CR</td>
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**Competence Certificate**
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

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

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

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

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

**Responsible:** Prof. Dr. Melanie Schienle  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Wahlmodule WIWI)

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

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<td>T-WIWI-103129</td>
<td>Stochastic Calculus and Finance</td>
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#### Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

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

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

#### 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 (Wahlmodule WIWI)

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

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Language</th>
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<td>T-WIWI-102647</td>
<td>Asset Pricing</td>
<td>4,5 CR</td>
<td>Deutsch/Englisch</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>T-WIWI-102623</td>
<td>Financial Intermediation</td>
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**Election block: Wahlpflichtangebot (1 item)**

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<td>Advanced Topics in Economic Theory</td>
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<tr>
<td>T-WIWI-102861</td>
<td>Advanced Game Theory</td>
<td>4,5 CR</td>
<td>Ehrhart, Puppe, Reiß</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 (Wahlmodule WIWI)
- Economics and Management (Wahlmodule BWL)

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

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<td>T-WIWI-107501</td>
<td>Energy Market Engineering</td>
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<tr>
<td>T-WIWI-107503</td>
<td>Energy Networks and Regulation</td>
<td>4,5</td>
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<tr>
<td>T-WIWI-107504</td>
<td>Smart Grid Applications</td>
<td>4,5</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of 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.
### 5.49 Module: Electronic Markets [M-WIWI-101409]

**Responsible:** Prof. Dr. Andreas Geyer-Schulz  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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

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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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<tr>
<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>
<td>T-WIWI-102640</td>
<td>Market Engineering: Information in Institutions</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-105946</td>
<td>Price Management</td>
<td>4,5 CR</td>
<td>Geyer-Schulz, Glenn</td>
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<tr>
<td>T-WIWI-102713</td>
<td>Telecommunication and Internet Economics</td>
<td>4,5 CR</td>
<td>Mitusch</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 (Wahlmodule WIWI) Economics and Management (Wahlmodule BWL)

Mandatory

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<th>Level</th>
<th>Version</th>
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<td>1 semester</td>
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| T-WIWI-107043 | Liberalised Power Markets | 3 CR | Fichtner |

Election block: Ergänzungsangebot (at least 6 credits)

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<th>Duration</th>
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<td>Each term</td>
<td>1 semester</td>
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| T-WIWI-102691 | Energy Trade and Risk Management | 4 CR | Cremer, Keles |
| T-WIWI-102607 | Energy Policy | 3.5 CR | Wietschel |
| T-WIWI-107501 | Energy Market Engineering | 4.5 CR | Weinhardt |
| T-WIWI-108016 | Simulation Game in Energy Economics | 3 CR | Genoese |
| T-WIWI-107446 | Quantitative Methods in Energy Economics | 3 CR | Keles, Plötz |
| T-WIWI-102712 | Regulation Theory and Practice | 4.5 CR | Mitusch |

Competence Certificate

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

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

Competence Goal

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

Prerequisites

The lecture Liberalised Power Markets has to be examined.

Content

Liberalised Power Markets: The European liberalisation process, energy markets, pricing, market failure, investment incentives, market power
Energy Trade and Risk Management: trade centres, trade products, market mechanisms, position and risk management
Simulation Game in Energy Economics: Simulation of the German electricity system

Recommendation

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

Annotation

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

Workload

The total workload for this module is approximately 270 hours. For further information see German version.
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 (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

Election block: Wahlpflichtangebot (at least 9 credits)

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<tr>
<th>Course Code</th>
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<td>T-WIWI-102793</td>
<td>Efficient Energy Systems and Electric Mobility</td>
<td>3,5 CR</td>
<td>Each term</td>
<td>1 semester</td>
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<td>T-WIWI-102650</td>
<td>Energy and Environment</td>
<td>4,5 CR</td>
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<td>T-WIWI-102830</td>
<td>Energy Systems Analysis</td>
<td>3 CR</td>
<td>Each term</td>
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<td>T-WIWI-107464</td>
<td>Smart Energy Infrastructure</td>
<td>3 CR</td>
<td>Each term</td>
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<tr>
<td>T-WIWI-102695</td>
<td>Heat Economy</td>
<td>3 CR</td>
<td>Each term</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.
5.52 Module: Entrepreneurship (EnTechnon) [M-WIWI-101488]

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

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

**Part of:**
- Economics and Management (Wahlmodule WIWI)
- Economics and Management (Wahlmodule BWL)

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

### Election block: Pflichtbestandteil (1 item)

| T-WIWI-102864 | Entrepreneurship | 3 CR | Terzidis |

### Election block: Wahlpflichtangebot (1 item)

| T-WIWI-102865 | Business Planning | 3 CR | Terzidis |
| T-WIWI-110389 | Business Planning for Founders - EUCOR | 3 CR | Terzidis |
| T-WIWI-102866 | Design Thinking | 3 CR | Terzidis |
| T-WIWI-102833 | Entrepreneurial Leadership & Innovation Management | 3 CR | Terzidis |
| T-WIWI-102894 | Entrepreneurship Research | 3 CR | Terzidis |
| T-WIWI-110381 | International Selling – EUCOR | 3 CR | Casernave, Klarmann |

### Election block: Ergänzungsangebot (1 item)

| T-WIWI-102866 | Design Thinking | 3 CR | Terzidis |
| T-WIWI-102851 | Developing Business Models for the Semantic Web | 3 CR | Sure-Vetter |
| T-WIWI-102833 | Entrepreneurial Leadership & Innovation Management | 3 CR | Terzidis |
| T-WIWI-102894 | Entrepreneurship Research | 3 CR | Terzidis |
| T-WIWI-102852 | Case Studies Seminar: Innovation Management | 3 CR | Weissenberger-Eibl |
| T-WIWI-102639 | Business Models in the Internet: Planning and Implementation | 4.5 CR | Weinhardt |
| T-WIWI-102865 | Business Planning | 3 CR | Terzidis |
| T-WIWI-110389 | Business Planning for Founders - EUCOR | 3 CR | Terzidis |
| T-WIWI-110374 | Firm creation in IT security | 3 CR | Terzidis |
| T-WIWI-102893 | Innovation Management: Concepts, Strategies and Methods | 3 CR | Weissenberger-Eibl |
| T-WIWI-110381 | International Selling – EUCOR | 3 CR | Casernave, Klarmann |
| T-WIWI-109064 | Joint Entrepreneurship Summer School | 6 CR | Terzidis |
| T-WIWI-102612 | Managing New Technologies | 3 CR | Reiß |
| T-WIWI-102853 | Roadmapping | 3 CR | Koch |

**Competence Certificate**
See German version.

**Competence Goal**
See German version.

**Prerequisites**
None

**Recommendation**
None

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

**Responsible:** Prof. Dr. Kay Mitusch  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Wahlmodule WIWI)

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

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<td>Environmental Economics and Sustainability</td>
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<td>T-WIWI-102616</td>
<td>Environmental and Resource Policy</td>
<td>4 CR</td>
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<td>T-WIWI-102650</td>
<td>Energy and Environment</td>
<td>4,5 CR</td>
<td>Karl</td>
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<td>T-WIWI-100007</td>
<td>Transport Economics</td>
<td>4,5 CR</td>
<td>Mitusch, Szimba</td>
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<tr>
<td>T-INFO-101348</td>
<td>Environmental Law</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 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.
5.54 Module: Experimental Economics [M-WIWI-101505]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)

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

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<td>T-WIWI-102863</td>
<td>Topics in Experimental Economics</td>
<td>4,5</td>
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<td>Reiß</td>
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<td>T-WIWI-105781</td>
<td>Incentives in Organizations</td>
<td>4,5</td>
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<td>T-WIWI-102614</td>
<td>Experimental Economics</td>
<td>4,5</td>
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**Competence Certificate**

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

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

**Competence Goal**

Students

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

**Prerequisites**

None.

**Content**

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

**Recommendation**

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

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
5.55 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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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

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<td>Each term</td>
<td>Ruckes</td>
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<tr>
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<td>Asset Pricing</td>
<td>4.5</td>
<td>Each term</td>
<td>Ruckes, Uhrig-Homburg</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Competence Goal**
The student
- has core skills in economics and methodology in the field of finance
- assesses corporate investment projects from a financial perspective
- is able to make appropriate investment decisions on financial markets

**Prerequisites**
None

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
5.56 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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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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.
5.57 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 (Wahlmodule WIWI)
- Economics and Management (Wahlmodule BWL)

**Credits:** 9
**Recurrence:** Each term
**Duration:** 1 semester
**Level:** 4
**Version:** 5

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

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

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

**Competence Goal**
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.
### 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.
5.59 Module: Formal Systems [M-INFO-100799]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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5.60 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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### 5.61 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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| T-INFO-101378 | Formal Systems II: Theory | 5 CR | Beckert |
5.62 Module: Future Networking [M-INFO-101205]

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

Credits 8  Recurrence Each term  Duration 1 semester  Level 4  Version 3

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

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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.
# 5.63 Module: Geometric Optimization [M-INFO-100730]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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## 5.64 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 9 credits)**

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<td>Data Protection by Design</td>
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<td>3 CR</td>
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<td>T-INFO-109910</td>
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5.65 Module: Growth and Agglomeration [M-WIWI-101496]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Wahlmodule WIWI)

Election block: Wahlpflichtangebot (9 credits)

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T-WIWI-109194 Dynamic Macroeconomics 4,5 CR Brumm
T-WIWI-102785 Theory of Endogenous Growth 4,5 CR Ott
T-WIWI-103107 Spatial Economics 4,5 CR Ott

Competence Certificate
The assessment is carried out as partial written exams (see the lectures descriptions).
The overall grade for the module is the average of the grades for each course weighted by the credits.

Competence Goal
The student

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

Prerequisites
None

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

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

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
### 5.66 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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5.67 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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</table>

**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

<table>
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<td>3 CR  Beyerer, Pak</td>
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Module: Industrial Production II [M-WIWI-101471]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

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Mandatory

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<tbody>
<tr>
<td>T-WIWI-102631</td>
<td>Planning and Management of Industrial Plants</td>
<td>5,5 CR</td>
<td>Schultmann</td>
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Election block: Ergänzungsangebot aus dem Modul Industrielle Produktion III (at most 1 item)

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

<table>
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<th>Credits</th>
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<td>Emissions into the Environment</td>
<td>3.5 CR</td>
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<tr>
<td>T-WIWI-102882</td>
<td>International Management in Engineering and Production</td>
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<td>T-WIWI-110512</td>
<td>Life Cycle Assessment</td>
<td>3.5 CR</td>
<td>Schultmann</td>
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</table>

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

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

Competence Goal

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

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

Content

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

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

The total effort for each course consists of attending lectures and tutorials, examination times and the time an average student needs to prepare himself in order to pass the exam with an average grade.
5 MODULES

Module: Industrial Production III [M-WIWI-101412]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

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

Mandatory

T-WIWI-102632 Production and Logistics Management 5,5 CR Schultmann

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

T-WIWI-102634 Emissions into the Environment 3,5 CR Karl
T-WIWI-102882 International Management in Engineering and Production 3,5 CR Sasse
T-WIWI-110512 Life Cycle Assessment 3,5 CR Schultmann

Election block: Ergänzungsangebot (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 Wiens
T-WIWI-102828 Supply Chain Management in the Automotive Industry 3,5 CR Heupel, Lang
T-WIWI-103134 Project Management 3,5 CR Schultmann

Competence Certificate
The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course Production and Logistics Management [2581954] and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Competence Goal

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

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

Content

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

Annotation
Apart from the core course the courses offered are recommendations and can be replaced by courses from the Module Industrial Production II.
Workload
The total amount of work for this module is approx. 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module.

The total number of hours per course results from the effort required to attend the lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.
5.71 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)

<table>
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<td>T-WIWI-110373</td>
<td>Advanced Information Systems</td>
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<td>T-WIWI-102886</td>
<td>Business Administration in Information Engineering and Management</td>
<td>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 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 information 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 automatize 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 addressed by presenting models and methods from system dynamics.
Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

Election block: Wahlpflichtangebot (at least 9 credits)

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<td>4,5 CR</td>
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<td>T-WIWI-108437</td>
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<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 informations systems in organizations
- is aware of the most important classes of information systems used in organizations: process-centric, information-centric and people-centric information systems.
- knows the most important activities required to execute in the pre-implementation, implementation and post-implementation phase of information systems in organizations in order to create business value
- has a deep understanding of key capabilities of business intelligence systems and/or interactive information systems used in organizations

Prerequisites
None

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

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

Annotation
New module starting summer term 2018.

Workload
The total workload for this module is approximately 270 hours.
5.73 Module: Innovation and Growth [M-WIWI-101478]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)

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<td>Theory of Endogenous Growth</td>
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<td>Innovation and -Policy</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 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.
5.74 Module: Innovation Economics [M-WIWI-101514]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)

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

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<td>4.5 CR</td>
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<td>T-WIWI-102906</td>
<td>Methods in Economic Dynamics</td>
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<td>T-WIWI-109864</td>
<td>Product and Innovation Management</td>
<td>3 CR</td>
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<td>T-WIWI-102789</td>
<td>Seminar in Economic Policy</td>
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**Competition 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.
### Module: Innovation Management [M-WIWI-101507]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

**Credits:** 9

**Recurrence:** Each term

**Duration:** 1 semester

**Level:** 4

**Version:** 6

#### Mandatory

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<td>Innovation Management: Concepts, Strategies and Methods</td>
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<td>Weissenberger-Eibl</td>
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#### Election block: Wahlpflichtangebot (1 item)

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<tr>
<td>T-WIWI-102873</td>
<td>Current Issues in Innovation Management</td>
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<tr>
<td>T-WIWI-108875</td>
<td>Digital Transformation and Business Models</td>
<td>3</td>
<td>Koch</td>
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<tr>
<td>T-WIWI-102852</td>
<td>Case Studies Seminar: Innovation Management</td>
<td>3</td>
<td>Weissenberger-Eibl</td>
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<tr>
<td>T-WIWI-108774</td>
<td>Analyzing and Evaluating Innovation Processes</td>
<td>3</td>
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<td>Innovation Processes Live</td>
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<td>A Closer Look at Social Innovation</td>
<td>3</td>
<td>Beyer</td>
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<td>T-WIWI-102858</td>
<td>Technology Assessment</td>
<td>3</td>
<td>Koch</td>
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<td>T-WIWI-102854</td>
<td>Technologies for Innovation Management</td>
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#### Election block: Ergänzungsangebot (1 item)

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<th>CR</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>T-WIWI-102873</td>
<td>Current Issues in Innovation Management</td>
<td>3</td>
<td>Weissenberger-Eibl</td>
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<tr>
<td>T-WIWI-102866</td>
<td>Design Thinking</td>
<td>3</td>
<td>Terzidis</td>
</tr>
<tr>
<td>T-WIWI-108875</td>
<td>Digital Transformation and Business Models</td>
<td>3</td>
<td>Koch</td>
</tr>
<tr>
<td>T-WIWI-102833</td>
<td>Entrepreneurial Leadership &amp; Innovation Management</td>
<td>3</td>
<td>Terzidis</td>
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<td>T-WIWI-102864</td>
<td>Entrepreneurship</td>
<td>3</td>
<td>Terzidis</td>
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<tr>
<td>T-WIWI-102852</td>
<td>Case Studies Seminar: Innovation Management</td>
<td>3</td>
<td>Weissenberger-Eibl</td>
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<tr>
<td>T-WIWI-108774</td>
<td>Analyzing and Evaluating Innovation Processes</td>
<td>3</td>
<td>Beyer</td>
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<tr>
<td>T-WIWI-110234</td>
<td>Innovation Processes Live</td>
<td>3</td>
<td>Beyer</td>
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<tr>
<td>T-WIWI-110263</td>
<td>Methods in Innovation Management</td>
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<td>Koch</td>
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<td>T-WIWI-102853</td>
<td>Roadmapping</td>
<td>3</td>
<td>Koch</td>
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<tr>
<td>T-WIWI-109932</td>
<td>A Closer Look at Social Innovation</td>
<td>3</td>
<td>Beyer</td>
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<tr>
<td>T-WIWI-102854</td>
<td>Technologies for Innovation Management</td>
<td>3</td>
<td>Koch</td>
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<tr>
<td>T-WIWI-102858</td>
<td>Technology Assessment</td>
<td>3</td>
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</table>

**Competence Certificate**

See German version.

**Competence Goal**

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

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

**Prerequisites**

The lecture "Innovation Management: Concepts, Strategies and Methods" and one of the seminars of the chair for Innovation and Technology Management are compulsory. The third course can be chosen from the courses of the module.
Content
The Innovation Management: Concepts, Strategies and Methods lecture course teaches concepts, strategies and methods which help students to form a systemic understanding of the innovation process and how to shape it. Building on this holistic understanding, the seminar courses then go into the subjects in greater depth and address specific processes and methods which are central to innovation management.

Recommendation
None

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
5.76 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

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**Election block: Innovative Konzepte des Daten- und Informationsmanagements (at least 1 item as well as at least 8 credits)**

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<td>Big Data Analytics</td>
<td>5</td>
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<tr>
<td>T-INFO-101306</td>
<td>Datamanagement in the Cloud</td>
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<tr>
<td>T-INFO-101317</td>
<td>Deployment of Database Systems</td>
<td>5</td>
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<td>T-INFO-101975</td>
<td>Consulting in Practice</td>
<td>1.5</td>
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<td>T-INFO-101976</td>
<td>Project Management in Practice</td>
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<td>T-INFO-101977</td>
<td>Selling IT-Solutions Professionally</td>
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<td>T-INFO-101257</td>
<td>Mechanisms and Applications of Workflow Systems</td>
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<td>T-INFO-105742</td>
<td>Big Data Analytics 2</td>
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<td>Böhm</td>
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<td>T-INFO-108377</td>
<td>Data Privacy: From Anonymization to Access Control</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.
5.77 Module: Insurance Management II [M-WIWI-101449]

**Responsive:** Prof. Dr. Ute Werner

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

**Part of:** Economics and Management (Wahlmodule BWL)

<table>
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Election block: Wahlpflichtangebot (9 credits)

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<td>T-WIWI-102648</td>
<td>Insurance Production</td>
<td>4.5 CR</td>
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<td>T-WIWI-102637</td>
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<td>Risk Communication</td>
<td>4.5 CR</td>
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<td>P+C Insurance Simulation Game</td>
<td>3 CR</td>
<td>Werner</td>
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<td>T-WIWI-102603</td>
<td>Principles of Insurance Management</td>
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<td>T-WIWI-102841</td>
<td>Modelling, Measuring and Managing of Extreme Risks</td>
<td>2.5 CR</td>
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**Competence Certificate**

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

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

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

**Competence Goal**

See German version.

**Prerequisites**

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

**Content**

See German version.

**Recommendation**

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

**Annotation**

Please note:

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
# 5.78 Module: Intellectual Property Law [M-INFO-101215]

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

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

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<td>Computer Contract Law</td>
<td>3 CR</td>
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<td>T-INFO-101308</td>
<td>Copyright</td>
<td>3 CR</td>
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<tr>
<td>T-INFO-101310</td>
<td>Patent Law</td>
<td>3 CR</td>
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<tr>
<td>T-INFO-101313</td>
<td>Trademark and Unfair Competition Law</td>
<td>3 CR</td>
<td>Matz</td>
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<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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</table>

**Prerequisites**

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

Cred 9
Lang Englisch
Lev 4
Vers 3

Election block: Wahlpflichtangebot (9 credits)

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<th>Course Title</th>
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<th>Language</th>
<th>Level</th>
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<td>9 CR</td>
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<td>T-WIWI-107032</td>
<td>Computational Risk and Asset Management I</td>
<td>4.5 CR</td>
<td>Ulrich</td>
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<td>T-WIWI-106494</td>
<td>Computational Risk and Asset Management II</td>
<td>4.5 CR</td>
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<td>T-WIWI-106193</td>
<td>Engineering FinTech Solutions</td>
<td>9 CR</td>
<td>Ulrich</td>
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</table>

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 regulations) 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.
5.80 Module: Intelligent Systems and Services [M-WIWI-101456]

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

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

**Part of:** Informatics

<table>
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**Election block: Wahlplflichtangebot (between 9 and 10 credits)**

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<td>Database Systems and XML</td>
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<tr>
<td>T-WIWI-106423</td>
<td>Information Service Engineering</td>
<td>4.5</td>
<td>Sack</td>
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<td>T-WIWI-102666</td>
<td>Knowledge Discovery</td>
<td>4.5</td>
<td>Sure-Vetter</td>
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<td>T-WIWI-103523</td>
<td>Advanced Lab Informatics</td>
<td>4.5</td>
<td>Oberweis, Sack, Sunyaev, Sure-Vetter, Volkamer, Zöllner</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 learning 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](http://www.aifb.kit.edu/web/Auslandsaufenthalt).
### 5.81 Module: Introduction to Video Analysis [M-INFO-100736]

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<th>Prof. Dr.-Ing. Jürgen Beyerer</th>
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<tr>
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<td>3 CR</td>
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5.82 Module: Lab Course: Natural Language Processing and Software Engineering [M-INFO-103138]

**Responsible:**  Prof. Dr. Walter Tichy  
**Organisation:**  KIT Department of Informatics  
**Part of:**  Informatics

<table>
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**Mandatory**

| T-INFO-106239 | Lab Course: Natural Language Processing and Software Engineering | 5 CR | Tichy |
### 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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5.84 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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**Mandatory**

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### 5.85 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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**Mandatory**

| T-INFO-101343 | Language Technology and Compiler | 8 CR | Snelting |

Information Engineering and Management M.Sc.  
Module Handbook as of 22.08.2019
5.86 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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<td>Machine Learning 2 – Advanced Methods</td>
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<td>Project Lab Cognitive Automobiles and Robots</td>
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<td>Project Lab Machine Learning</td>
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**Competition 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 credit points 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 credit points and is cut off after the first comma point.

**Competition 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.).

**Annotation**
This new module can be chosen from summer term 2017.

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

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

**Election block: MVW Pflichtblock (at least 1 item as well as at least 3 credits)**

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<td>Introduction to Video Analysis</td>
<td>3</td>
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<tr>
<td>T-INFO-101292</td>
<td>Image Data Compression</td>
<td>3</td>
<td>Beyerer, Pak</td>
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<td>T-INFO-101363</td>
<td>Automated Visual Inspection and Image Processing</td>
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**Election block: MVW - Wahlpflicht (at least 1 item as well as at least 6 credits)**

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<td>Pattern Recognition</td>
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<td>T-INFO-101347</td>
<td>Computer Vision for Human-Computer Interaction</td>
<td>6</td>
<td>Stiefelhagen</td>
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<td>T-INFO-101297</td>
<td>Biometric Systems for Person Identification</td>
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<td>T-INFO-105943</td>
<td>Practical Course Computer Vision for Human-Computer Interaction</td>
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<td>T-INFO-109796</td>
<td>Deep Learning for Computer Vision</td>
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5.88 Module: Management Accounting [M-WIWI-101498]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**

Students
- are familiar with various management accounting methods,
- can apply these methods for cost estimation, profitability analysis, and product costing,
- are able to analyze short-term and long-decisions with these methods,
- have the capacity to devise instruments for organizational control.

**Prerequisites**

None

**Content**
The module consists of two courses "Management Accounting 1" and "Management Accounting 2". The emphasis is on structured learning of management accounting techniques.

**Annotation**
The following courses are part of this module:
- The course Management Accounting 1, which is offered in every summer semester
- The course Management Accounting 2, which is offered in every winter semester

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Market Engineering [M-WIWI-101446]

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

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

**Part of:**
- Economics and Management (Wahlmodule WIWI)
- Economics and Management (Wahlmodule BWL)

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

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<td>Auction Theory</td>
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<td>T-WIWI-108880</td>
<td>Blockchain &amp; Cryptofinance</td>
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<td>Schuster, Uhrig-Homburg</td>
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<td>T-WIWI-109941</td>
<td>eFinance: Information Systems for Securities Trading</td>
<td>4.5</td>
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<td>T-WIWI-107501</td>
<td>Energy Market Engineering</td>
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<td>Energy Networks and Regulation</td>
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<td>Smart Grid Applications</td>
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**Competence Certificate**

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

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

**Competence Goal**

The students

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

**Prerequisites**

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

**Content**

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

**Recommendation**

None

**Annotation**

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

**Workload**

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

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

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

**Part of:**
- Economics and Management (Wahlmodule WIWI)
- Economics and Management (Wahlmodule BWL)

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

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<td>T-WIWI-102883</td>
<td>Pricing</td>
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<td>Feurer</td>
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<td>Product and Innovation Management</td>
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**Election block: Ergänzungsangebot (at most 1 item)**

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<td>Marketing Strategy Business Game</td>
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**Competence Certificate**

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

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

**Competence Goal**

Students

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

**Prerequisites**

None

**Content**

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

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

**Annotation**

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

**Workload**

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

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Wahlmodule WIWI)

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

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<td>T-WIWI-102726</td>
<td>Global Optimization I</td>
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<td>T-WIWI-103638</td>
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<td>T-WIWI-102856</td>
<td>Convex Analysis</td>
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<td>Nonlinear Optimization I</td>
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**Election block: Ergänzungsangebot (at most 2 items)**

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<td>Global Optimization II</td>
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<td>Graph Theory and Advanced Location Models</td>
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<td>Multivariate Statistical Methods</td>
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<td>Operations Research in Supply Chain Management</td>
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<td>Optimization Models and Applications</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.
### 5.92 Module: Meshes and Point Clouds [M-INFO-100812]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics

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Prautzsch
5.93 Module: Microeconomic Theory [M-WIWI-101500]

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

Credits 9  Language Deutsch/Englisch  Level 4  Version 3

Election block: Wahlpflichtangebot (at least 9 credits)

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<td>Auction Theory</td>
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<td>Incentives in Organizations</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 this 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.
5.94 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>
<td>5 CR</td>
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</table>
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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5.96 Module: Models of Parallel Processing [M-INFO-100828]

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

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</table>

**Recommendation**  
Siehe Teilleistung
5.97 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

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**Mandatory**

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

**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.
Content

- 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 of an 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 months 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).
- The master thesis is reviewed and graded by the supervisor and the additional examiner. The team of supervisor and examiner must represent both faculties participating in the degree programme (Department of Informatics, Department of Economics and Management). At least one of the two must be professor or junior professor. If the grades of the supervisor and the examiner differ, the examination board sets the mark within this limit.
- 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.
5.98 Module: Network Economics [M-WIWI-101406]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)

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<td>T-WIWI-102712</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

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5.100 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>Practical Course Protocol Engineering</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 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.
5.101 Module: Networking Labs [M-INFO-101204]

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

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

### Credits
- **9**

### Recurrence
- **Each term**

### Duration
- **1 semester**

### Level
- **4**

### Version
- **2**

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

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<td>IT-Security Management for Networked Systems</td>
<td>5 CR</td>
<td>Hartenstein</td>
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</table>

**Competence Goal**

Each student should be able to:

- learn and apply the concepts and principals of wireless network design
- identify the flaws and benefits of wireless communication systems
- 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.

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

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Election block: Netz sicherheit - Theorie und Praxis (at least 1 item as well as at least 9 credits)

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<td>T-INFO-101371</td>
<td>Security</td>
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<td>Symmetric Encryption</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.
5.103 Module: Operations Research in Supply Chain Management [M-WIWI-102832]

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)

**Credits** 9  **Language** Deutsch  **Level** 4  **Version** 6

### Election block: Wahlpflichtangebot (at most 2 items)

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<td>T-WIWI-106200</td>
<td>Modeling and OR-Software: Advanced Topics</td>
<td>4,5 CR</td>
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### Election block: Ergänzungsangebot (at most 2 items)

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<td>Discrete-Event Simulation in Production and Logistics</td>
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<td>Facility Location and Strategic Supply Chain Management</td>
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<td>T-WIWI-102714</td>
<td>Tactical and Operational 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 § 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 asserts the compliance of delivery times and further constraints. Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Supply Chain Management, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Recommendation
Basic knowledge as conveyed in the module Introduction to Operations Research [WI1OR] is assumed.

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

Workload
Total effort for 9 credits: ca. 270 hours
- Presence time: 84 hours
- Preparation/Wrap-up: 112 hours
- Examination and examination preparation: 74 hours
5.104 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) |

| Credits | 5 |
| Recurrence | Each winter term |
| Duration | 1 semester |
| Level | 4 |
| Version | 1 |

**Mandatory**

| T-WIWI-106545 | Optimization under Uncertainty | 4,5 CR | Rebennack |

**Competence Certificate**
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

**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.
### 5.105 Module: Parallel Algorithms [M-INFO-100796]

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

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

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<td>Analyzing Big Data - Laboratory Course</td>
<td>4 CR</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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**Mandatory**

| T-INFO-103201 | Practical Course: Database Systems | 4 CR | Böhm |
5.110 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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</table>
### 5.112 Module: Practical Course: Smart Data Analytics [M-INFO-103235]

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

<table>
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**Mandatory**

| T-INFO-106426 | Practical Course: Smart Data Analytics | 6 CR | Beigl |
5.113 Module: Private Business Law [M-INFO-101216]

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

<table>
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**Election block: Recht der Wirtschaftsunternehmen (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-101316</td>
<td>Law of Contracts</td>
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<td>T-INFO-101314</td>
<td>Tax Law II</td>
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<td>Dietrich, Dreier</td>
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<td>T-INFO-101315</td>
<td>Tax Law I</td>
<td>3 CR</td>
<td>Dreier</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.
5.114 Module: Public Business Law [M-INFO-101217]

Responsible: Prof. Dr. Matthias Bäcker
Organisation: KIT Department of Informatics
Part of: Law

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Election block: Öffentliches Wirtschaftsrecht (at least 1 item as well as at least 9 credits)

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<td>Data Protection Law</td>
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Competence Certificate
see course description.
### 5.115 Module: Randomized Algorithms [M-INFO-100794]

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

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Information Engineering and Management M.Sc.  
Module Handbook as of 22.08.2019
### 5.116 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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Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
Module: Sales Management [M-WIWI-101487]

**M.117 Module: Sales Management [M-WIWI-101487]**

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

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

**Part of:**
- Economics and Management (Wahlmodule WIWI)
- Economics and Management (Wahlmodule BWL)

**Credits:** 9

**Duration:** 1 semester

**Level:** 4

**Version:** 8

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

**Mandatory**

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

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<tr>
<td>T-WIWI-106981</td>
<td>Digital Marketing and Sales in B2B</td>
<td>1.5 CR</td>
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<td>T-WIWI-110389</td>
<td>Business Planning for Founders - EUCOR</td>
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<td>T-WIWI-110381</td>
<td>International Selling – EUCOR</td>
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<td>T-WIWI-102891</td>
<td>Price Negotiation and Sales Presentations</td>
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**Election block: Ergänzungsangebot (at most 2 items)**

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<td>Market Research</td>
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<td>T-WIWI-102883</td>
<td>Pricing</td>
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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course.

**Competence Goal**

**Students**

- have an advanced knowledge about sales management (design and structure of sales systems, relationship with sales partners and important customers)
- have a fundamental understanding of price management (in particular consumer behavior of pricing, pricing strategy, price determination)
- are able to handle particularities and challenges in sales management
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- are able to implement their extensive sales and pricing knowledge in a practical context
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the sales department

**Prerequisites**
The course "Sales Management and Retailing" is compulsory.

**Content**
The aim of the module is to deepen the sales management knowledge of the students. Theoretical approaches often have a combined view on marketing and sales, whereas in practical surroundings the sales department is completely separated from the marketing tasks. Given this fact, we concentrate on pure sales management topics and address different facets of the sales management.

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
5.118 Module: Secure Multiparty Computation [M-INFO-104119]

**Responsible:** Prof. Dr. Jörn Müller-Quade

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

<table>
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**Mandatory**

| T-INFO-108540 | Secure Multiparty Computation | 3 CR | Müller-Quade |

Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
5.119 Module: Semantic Technologies [M-WIWI-101457]

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

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Election block: Wahlpflichtangebot (between 8 and 10 credits)

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<td>Web Science</td>
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<td>T-WIWI-103523</td>
<td>Advanced Lab Informatics</td>
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<td>Oberweis, Sack, Sunyaev, Sure-Vetter, Volkamer, Zöllner</td>
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<td>T-WIWI-103480</td>
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<td>3 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.

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.

Prerequisites
None

Content
The module Semantic Technologies covers the basics, methods and applications for intelligent systems in the World Wide Web. Fundamental to this is the scalable provision of knowledge, the provision of data as linked data, and methods for analyzing networks. Formal basics and practical aspects such as knowledge modelling and available tools for representation languages for ontologies are dealt with in detail. Methods for implementing intelligent systems on the World Wide Web will also be clarified and applications such as Web 2.0 or Service Science will be discussed and evaluated. Furthermore, methods for network analysis and the resulting findings are taught. These findings can be used to design recommendation systems and explain social networking phenomena. A variety of procedures exist to identify patterns that, if interpreted valuable, may provide previously unknown insights. This information can be predictive or descriptive.

Workload
The total workload for this module is approximately 240 hours. For further information see German version.
5.120 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

Election block: Wahlpflichtangebot (1 item)

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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.
Organisation: KIT Department of Informatics
KIT Department of Economics and Management
Part of: Research Course

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Election block: Seminar Informatik (1 item)

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5.122 Module: Seminar Module Law [M-INFO-101218]

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

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Mandatory

| T-INFO-101997 | Seminar: Legal Studies I | 3 CR | Dreier |
5.123 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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

### Election block: Wahlpflichtangebot (9 credits)

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<td>T-WIWI-102899</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 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.
5.124 Module: Service Computing [M-WIWI-102827]

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

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

**Part of:** Informatics

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

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**Competence Certificate**
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 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

- demonstrates basic competency in the areas of data and system integration on the web
- learn new Web-based architectures and applications, as well as concepts related to Web 2.0, Cloud Computing and Semantic Web
- know the different machine learning procedures for the supervised as well as the unsupervised learning
- learn methods regarding network theory and network analysis

**Prerequisites**
None.

**Content**
Services can be considered from different perspectives. Computer Science considers Services and Web Services traditionally as a piece of software, which fulfills a specific task. By the permanent rise of Cloud Applications, these services become more important. The offered Services and their functionalities have to be described sufficiently in order to be detectable.

In this module the most important network learning methods are introduced and their applicability is discussed with regard to different information sources.

Furthermore, network analysis is presented, as well as architectures and descriptions for Services.

Thereby, the practical usability of the presented methods and algorithms in their particular fields of application are compared.

**Recommendation**
None

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Service Design Thinking [M-WIWI-101503]

5.125 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 (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

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

Mandatory

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<td>12 CR</td>
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Competence Certificate
The assessment is carried out as a general exam (according to Section 4(2), 3 of the examination regulation). The overall grade of the module is the grade of the examination (according to Section 4(2), 3 of the examination regulation).

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

Prerequisites
None

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

Recommendation
This course is held in English – proficiency in writing and communication is required.
Our past students recommend to take this course at the beginning of the masters program.

Annotation
Due to practical project work as a component of the program, access is limited.
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.
For more information on the application process and the program itself are provided in the module component description and the program's website (http://sdt-karlsruhe.de).
Furthermore, the KSRI conducts an information event for applicants every year in May.
This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.
Workload
The total amount of work for this module is approx. 270 hours (9 credits). The workload for this course is comparably high as the course runs in cooperation with partner universities from around the world as well as partner companies. This causes overhead.
5.126 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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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<td>T-WIWI-110280</td>
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<tr>
<td>T-WIWI-106201</td>
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<tr>
<td>T-WIWI-102640</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.
5.127 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 (Wahlmodule WIWI)
Economics and Management (Wahlmodule BWL)

Credits 9  Language Deutsch  Level 4  Version 2

Election block: Wahlpflichtangebot (9 credits)

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<td>T-WIWI-102639</td>
<td>Business Models in the Internet: Planning and Implementation</td>
<td>4,5 CR</td>
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<td>4,5 CR</td>
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<td>Practical Seminar Service Innovation</td>
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<td>Service Innovation</td>
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Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), 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.
### 5.128 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 (Wahlmodule WIWI)  
Economics and Management (Wahlmodule BWL)

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

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<td>4,5</td>
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<td>Digital Transformation of Organizations</td>
<td>4,5</td>
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<td>4,5</td>
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<td>Modeling and Analyzing Consumer Behavior with R</td>
<td>4,5</td>
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**Competence Certificate**  
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**  
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 Business and IT Service Management [2590484] is compulsory and must be examined.

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

**Recommendation**  
None

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

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

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

**Part of:** Economics and Management (Wahlmodule WIWI)

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<th>Level</th>
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**Election block: Wahlpflichtangebot (at most 2 items)**

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

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

**Competence Goal**

**Students**

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

**Prerequisites**
The 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.
5.130 Module: Software Methods [M-INFO-101202]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

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

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<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>
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<tr>
<td>T-INFO-101272</td>
<td>Natural Language Processing and Software Engineering</td>
<td>3 CR</td>
<td>Tichy</td>
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<td>T-INFO-101278</td>
<td>Model Driven Software Development</td>
<td>3 CR</td>
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<tr>
<td>T-INFO-101335</td>
<td>Empirical Software Engineering</td>
<td>4 CR</td>
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<td>T-INFO-101300</td>
<td>Requirements Engineering</td>
<td>3 CR</td>
<td>Koziolek</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.
5.131 Module: Software Systems [M-INFO-101201]

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

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

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<td>T-INFO-101339</td>
<td>Software Development for Modern, Parallel Platforms</td>
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<tr>
<td>T-INFO-101325</td>
<td>Multicore Computers and Computer Clusters</td>
<td>4</td>
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<tr>
<td>T-INFO-101281</td>
<td>Formal Systems II: Application</td>
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<td>Requirements Engineering</td>
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**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.
5.132 Module: Stochastic Optimization [M-WIWI-103289]

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

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**Election block: Wahlpflichtangebot (between 1 and 2 items)**

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

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<td>Mixed Integer Programming I</td>
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<td>Multivariate Statistical Methods</td>
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<td>T-WIWI-102715</td>
<td>Operations Research in Supply Chain Management</td>
<td>4.5 CR</td>
<td>Nickel</td>
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<tr>
<td>T-WIWI-106545</td>
<td>Optimization under Uncertainty</td>
<td>4.5 CR</td>
<td>Rebennack</td>
</tr>
<tr>
<td>T-WIWI-110162</td>
<td>Optimization Models and Applications</td>
<td>4.5 CR</td>
<td>Sudermann-Merx</td>
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<tr>
<td>T-WIWI-106552</td>
<td>Simulation of Stochastic Systems</td>
<td>4.5 CR</td>
<td>Grothe, Rebennack</td>
</tr>
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</table>

**Competence Certificate**

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

The assessment procedures are described for each course of the module separately.

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

**Competence Goal**

The student

- 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.
5.133 Module: Subdivision Algorithms [M-INFO-101864]

Responsible: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics

<table>
<thead>
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Mandatory

| T-INFO-103550 | Subdivision Algorithms | 5 CR | Prautzsch |

Prerequisites

None
Module: Telematics [M-INFO-100801]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics

<table>
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<td>T-INFO-101338</td>
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**Module: Theory and Practice of Data Warehousing and Mining [M-INFO-101256]**

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

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

**Election block: Praktikum (at most 1 item as well as at most 4 credits)**

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

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<td>T-INFO-101305</td>
<td>Big Data Analytics</td>
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<tr>
<td>T-INFO-105742</td>
<td>Big Data Analytics 2</td>
<td>3</td>
<td>CR</td>
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<tr>
<td>T-INFO-101317</td>
<td>Deployment of Database Systems</td>
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<td>CR</td>
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<td>T-INFO-101306</td>
<td>Datamanagement in the Cloud</td>
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<td>T-INFO-108377</td>
<td>Data Privacy: From Anonymization to Access Control</td>
<td>3</td>
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**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.
5.136 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 (Wahlmodule WIWI)

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

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<td>T-WIWI-103107</td>
<td>Spatial Economics</td>
<td>4,5</td>
<td>Ott</td>
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<tr>
<td>T-WIWI-100007</td>
<td>Transport Economics</td>
<td>4,5</td>
<td>Mitusch, Szimba</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 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.
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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**Mandatory**

<table>
<thead>
<tr>
<th>T-INFO-101326</th>
<th>Ubiquitous Computing</th>
<th>5 CR</th>
<th>Beigl</th>
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</table>
Module: Ubiquitous Computing [M-WIWI-101458]

5.138 Module: Ubiquitous Computing [M-WIWI-101458]

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

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

<table>
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<tbody>
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<td>5 CR</td>
<td>Beigl</td>
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Election block: Ergänzungsangebot (between 4 and 5 credits)

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>Lecturer</th>
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<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.
5.139 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

<table>
<thead>
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<th>Credits</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Deutsch/Englisch</td>
<td>4</td>
<td>2</td>
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</tbody>
</table>

**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.
5.140 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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<tbody>
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Mandatory

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<td>Sure-Vetter</td>
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<td>T-WIWI-103112</td>
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<td>T-WIWI-103523</td>
<td>Advanced Lab Informatics</td>
<td>4,5</td>
<td>Oberweis, Sack, Sunyaev, Sure-Vetter, Volkamer, Zöllner</td>
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Election block: Ergänzungsangebot (between 4 and 5 credits)

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.

Prerequisites
The lecture **Semantic Web Technologies**[2511310] is obligatory and has to be absolved.

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
See German version.
**5.141 Module: Wireless Networking [M-INFO-101203]**

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

<table>
<thead>
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**Election block: Wireless Networking (at least 1 item as well as at least 8 credits)**

| T-INFO-101337 | Internet of Everything | 4 CR Zitterbart |
| T-INFO-101322 | Mobile Communication   | 4 CR Waldhorst, Zitterbart |
| T-INFO-101326 | Ubiquitous Computing   | 5 CR Beigl |

**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  
M-WIWI-101507 - Innovation Management

<table>
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<td>2 SWS</td>
<td>2545105</td>
<td>Beyer</td>
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<td></td>
<td>Soziale Innovation unter die Lupe genommen</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.

**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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<td>Each term</td>
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**Events**

|---------|---------|-------------------------------------------------|-------|-------------|-----------------------------------------|
6 COURSES

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

**Responsible:** Jun.-Prof. Dr. Julian Thimme
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

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<th>Recurrence</th>
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<td>2 SWS</td>
<td>Advanced Empirical Asset Pricing</td>
<td>Lecture (V)</td>
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<td>WS 19/20 2530570</td>
<td>1 SWS</td>
<td>Übung zu Advanced Empirical Asset Pricing</td>
<td>Practice (Ü)</td>
<td>Thimme</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: Englisch, Open in study portal

**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 programming 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.
### 6.4 Course: Advanced Game Theory [T-WIWI-102861]

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

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

**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101453 - Applied Strategic Decisions  
- M-WIWI-101500 - Microeconomic Theory  
- M-WIWI-101502 - Economic Theory and its Application in Finance

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**Events**

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**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: Englisch, [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.
6.5 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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**Competence Certificate**

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

**Modeled Conditions**

The following conditions have to be fulfilled:

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

**Recommendation**

None

**Annotation**

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

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

**V Foundations of Information Systems**

2540450, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal](#)

**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-INFO-102233 - Further Examinations
M-WIWI-101458 - Ubiquitous Computing

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**Competence Certificate**
See German version

**Prerequisites**
None

**Annotation**
See German Version
6.7 Course: Advanced Lab Informatics [T-WIWI-103523]

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

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

**Part of:**
- M-INF-102233 - Further Examinations
- 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

**Type**
- Examination of another type

**Credits**
- 4.5

**Recurrence**
- Each term

**Version**
- 2

**Events**

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<td>Praktikum Betriebliche Informationssysteme: Realisierung innovativer Dienste für Studierende</td>
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<td>SS 2019</td>
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<td>Data Science &amp; Real-time Big Data Analytics</td>
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**Competence Certificate**

**Advanced Lab "Privacy Friendly Apps":**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of of a practical work in which a software functionality must be implemented and three interim submissions of the software to be developed. The weighting of the individual components will be announced during the first meeting.

**All other courses of the Institute AIFB:**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:
- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.
Prerequisites
None

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

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

Knowledge Discovery and Data Mining
2512300, SS 2019, 3 SWS, Language: Englisch, Open in study portal

Description
The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

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

Learning Content
Domains of interest include, but are not limited to:
- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:
- Mitchell, T.; Machine Learning

Data Science & Real-time Big Data Analytics
2513306, SS 2019, 2 SWS, Language: Deutsch/Englisch, Open in study portal

Description
Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

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

Practical course (P)

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

Linked Data and the Semantic Web
2512301, WS 19/20, 3 SWS, Language: Deutsch/Englisch, Open in study portal
Description
The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

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

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

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

Learning Content
Topics of interest include, but are not limited to:

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

Real-World Challenges in Data Science and Analytics
2512311, WS 19/20, 3 SWS, Language: Deutsch/Englisch, Open in study portal

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

Sociotechnical Information Systems Development
2512400, WS 19/20, 3 SWS, Language: Deutsch/Englisch, Open in study portal

Description
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Workload
4 ECTS = approx. 120 h

Praktikum Security, Usability and Society
2512551, WS 19/20, 3 SWS, , Open in study portal

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

Projektpraktikum Information Service Engineering
2512600, WS 19/20, 2 SWS, Language: Englisch, Open in study portal
Description
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.

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

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-104520 - Human Factors in Security and Privacy

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**Events**

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**Competence Certificate**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

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

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

**Prerequisites**
None
6 COURSES

T 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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Competence Certificate

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

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

Prerequisites

None

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

V Advanced Machine Learning

2540535, SS 2019, 2 SWS, Language: Englisch, [Open in study portal]

Learning Content

Tentative Course Outline:

- Introduction
- Statistical Inference
- Shrinkage Methods
- Model Assessment and Selection
- Tree-based Machine Learning Algorithms
- Dimensionality Reduction
- Neural Networks and Deep Learning
- Natural Language Processing with Deep Learning
- Support Vector Machine

Workload

Time of attendance:

- Attending the lecture: 13 x 90min = 19h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
Literature

6 COURSES

Course: Advanced Management Accounting [T-WIWI-102885]

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: Englisch, Open in study portal

Notes

see Module Handbook
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).

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).
6.12 Course: Advanced Statistics [T-WIWI-103123]

**Responsible:** Prof. Dr. Oliver Grothe  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-101637 - Analytics and Statistics

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**Competence Certificate**

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

**Prerequisites**

None

**Annotation**

New course starting winter term 2015/2016

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

**Statistik für Fortgeschrittene**

2550552, WS 19/20, 2 SWS, [Open in study portal](#)

**Learning Content**

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

**Literature**

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

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M/INFO-102233 - Further Examinations
         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-INFO-102233 - Further Examinations
- M-WIWI-101406 - Network Economics
- M-WIWI-101500 - Microeconomic Theory
- M-WIWI-101502 - Economic Theory and its Application in Finance

### Competence Certificate

The course T-WIWI-102609 "Advanced Topics in Economic Theory" restarts in summer term 2019.

The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

### Prerequisites

None

### Recommendation

This course is designed for advanced Master students with a strong interest in economic theory and mathematical models. Bachelor students who would like to participate are free to do so, but should be aware that the level is much more advanced than in other courses of their curriculum.

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

#### Advanced Topics in Economic Theory

2520527, SS 2019, 2 SWS, Language: Englisch, [Open in study portal](#)

**Lecture (V)**

### 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>
<th>Sanders, Lamm</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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### T 6.17 Course: Algorithmic Methods for Network Analysis [T-INFO-104759]

**Responsible:** Prof. Dr. Henning Meyerhenke  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-102400 - Algorithmic Methods for Network Analysis

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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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<th>3 SWS</th>
<th>Lecture / Practice (VÜ)</th>
<th>Wagner, Buchhold, Zeitz, Zündorf, Sauer</th>
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**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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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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</table>
**Course: Analyzing and Evaluating Innovation Processes [T-WIWI-108774]**

**Responsible:** Dr. Daniela Beyer

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

**Part of:**
- M-INFO-102233 - Further Examinations
- 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).

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]

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<tr>
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<th>Prof. Dr.-Ing. Klemens Böhm</th>
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### Examination of another type: 4 Credits

#### Events

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Böhm, Steinbüß
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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Competence Certificate
The assessment consists of a written exam (60 min) according to §4(2), 1 of the examination regulations.

Prerequisites
None

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

Artificial Intelligence in Service Systems
2595650, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Learning Content
Artificial Intelligence and the application of machine learning is becoming more and more popular to solve relevant business challenges. However, it is not only important to be familiar with precise algorithms, but rather a general understanding of the necessary steps with a holistic view—from real-world challenge to successful deployment of an AI. As part of this course, we teach the complete lifecycle of an AI project with a focus on supervised machine learning challenges. We do so by also teaching the use of Python and the required packages like scikit-learn and tensorflow with exemplary data. We then take this knowledge to the more complex case of service systems with different entities (e.g. companies) who interact with each other and show possibilities on how to derive holistic insights. Two possibilities to do so are the use of meta and transfer machine learning, where we teach insights in their theory, design and application.
6.26 Course: Asset Pricing [T-WIWI-102647]

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

Organisation:
KIT Department of Economics and Management

Part of:
M-INFO-102233 - Further Examinations
M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Economic Theory and its Application in Finance

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<td>Practice (Ü)</td>
<td>Uhrig-Homburg, Reichenbacher</td>
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Competence Certificate

The success control takes place in the 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 2019, 2 SWS, Language: Deutsch, 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-101197 - Computer Security  
M-INFO-101198 - Advanced Topics in Cryptography  
M-INFO-102233 - Further Examinations

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

Asymmetric Encryption Schemes
24115, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

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-INFO-102233 - Further Examinations
- 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

Responsibility: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management

Part of:
- M-INFO-102233 - Further Examinations
- M-WIWI-103261 - Disruptive FinTech Innovations

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Competence Certificate
The grade consists of a written thesis and an oral presentation.

Prerequisites
There are two conditions for taking this course:

1. This course is only open for registered students of the module “Disruptive FinTech Innovations”.
2. Registered students do also attend in the same semester the lecture “Engineering FinTech Solutions” and the programming internship “Computational FinTech with Python and C++”.

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

Automated Financial Advisory
2530372, SS 2019, 2 SWS, Language: Englisch, Open in study portal

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

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

Literature
Literature will be distributed during the first lecture.
### 6.30 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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Information Engineering and Management M.Sc.  
Module Handbook as of 22.08.2019
6.31 Course: Automated Visual Inspection and Image Processing [T-INFO-101363]

**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

**Type:** Written examination

**Credits:** 6

**Recurrence:** Each winter term

**Version:** 2

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**Events**

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<td>4</td>
<td>Lecture (V)</td>
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</table>

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

**Automated Visual Inspection and Image Processing**

24169, WS 19/20, 4 SWS, Language: Deutsch, 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 COURSES

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

<table>
<thead>
<tr>
<th>Responsible:</th>
<th>Gerd Gutekunst</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Prof. Dr. Berthold Wigger</td>
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<tr>
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<td>KIT Department of Economics and Management</td>
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<tr>
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<td>2560134</td>
<td>Basics of German Company Tax Law and Tax Planning</td>
<td>3 SWS Lecture (V)</td>
<td>Wigger, Gutekunst</td>
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</table>

**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
None

**Recommendation**
Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course “Öffentliche Einnahmen” beforehand.
T 6.33 Course: Big Data Analytics [T-INFO-101305]

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

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100768 - Big Data Analytics
- 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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Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
### 6.34 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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</table>

**Prerequisites**

none
6.35 Course: Biologically Inspired Robot [T-INFO-101351]

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

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101251 - Autonomous Robotics
- M-INFO-102233 - Further Examinations

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</table>
6.36 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

Type: Oral examination
Credits: 3
Version: 1

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<td>Lecture (V)</td>
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Below you will find excerpts from events related to this course:

Biometric Systems for Person Identification
2403011, SS 2019, 2 SWS, Language: Englisch, Open in study portal

Description
Biometrics deals with the science of recognizing and identifying humans based on their biometrics traits, such as fingerprints, 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

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

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

Organisation: KIT Department of Economics and Management

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

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<td>Blockchains &amp; Cryptofinance</td>
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<td>Übung zu Blockchains &amp; Cryptofinance</td>
<td>1</td>
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</table>

Competence Certificate
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations). A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

Prerequisites
None

Recommendation
None

Annotation

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

Blockchains & Cryptofinance
2530567, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal]

Lecture (V)

Workload
Gesamtaufwand bei 4,5 Leistungspunkten: ca. 135.0 Stunden
Präsenzzeit: 30 Stunden
Vor – und Nachbereitung der LV: 45.0 Stunden
Prüfung und Prüfungsvorbereitung: 60.0 Stunden
6.38 Course: Building Intelligent and Robo-Adviced Portfolios [T-WIWI-106442]

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-103247 - Intelligent Risk and Investment Advisory

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</table>

**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.
6.39 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.INFO-102233 - Further Examinations
- M-WIWI-101409 - Electronic Markets
- M-WIWI-101443 - Information Engineering and Management

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

**Competence Certificate**
The lecture is no longer offered.

**Prerequisites**
None

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

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

**Business Administration in Information Engineering and Management**
2540500, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Learning Content**
In this lecture, classical Business Administration is applied to businesses in an information- and communication-technological environment. The process to extract relevant data for decision making from operational accounting systems receives special attention. In order to do so, topics such as activity-based costing and transaction costs models are addressed. The automization 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 addressed by presenting models and methods from system dynamics.

**Workload**
The total workload for this course is approximately 150 hours (5 credits):

**Time of attendance**
- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

**Self-study**
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 40h 00m
- Preparation of the examination: 31h 00m

**Sum:** 150h 00m
Literature

6.40 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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**Events**

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<td>Business Data Analytics: Application and Tools</td>
<td>Lecture (V)</td>
<td>Weinhardt, Dann, Staudt</td>
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<td>SS 2019</td>
<td>1 SWS</td>
<td>Exercise Business Data Analytics: Application and Tools</td>
<td>Practice (Ü)</td>
<td>Haubner, Dann, Frankenhauser, Staudt</td>
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</table>

**Competence Certificate**

Assessment consists of a written exam of one hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

Students receive one aggregated grade consisting of a written exam (60%) and the Analytics Challenge (40%). The exam and the Analytics Challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Analytics challenge.

**Prerequisites**

None

**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 2019, 2 SWS, Language: Deutsch, [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.
6.41 Course: Business Data Strategy [T-WIWI-106187]

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

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

**Part of:** M/INFO-102233 - Further Examinations
M/WIWI-103117 - Data Science: Data-Driven Information Systems

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 1

**Events**

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**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 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: Englisch, Open in study portal**

**Lecture (V)**

**Learning Content**
With new methods for capturing and using different types of data and industry’s recognition that society’s use of data is less than optimal, the need for comprehensive strategies is more important than ever before. Advances in cybersecurity and information sharing and the use of data in its raw form for decision making add to the complexity of integrated processes, ownership, stewardship, and sharing. The life cycle of data in its entirety spans the infrastructure, system design, development, integration, and implementation of information-enabling solutions. This lecture focuses on teaching about these dynamics and tools to comprehend and manage them in organisation contexts. Given the increasing size and complexity of data, methods for the transformation and structured preparation are an important tool in the process of sense-making. Modern software solutions and programming languages provide frameworks for such tasks that form another part of this course ranging from conceptual systems modelling to data manipulation to automated generation of HTML reports and web-applications.

**Literature**

- Fleckenstein & Fellows (2017) – Modern Data Strategy
- Leimeister (2015) – Einführung in die Wirtschaftsinformatik
- Urbach & Ahlemann (2016) – IT-Management im Zeitalter der Digitalisierung
6.42 Course: Business Dynamics [T-WIWI-102762]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101409 - Electronic Markets
M-WIWI-101470 - Data Science: Advanced CRM

Type
Written examination
Credits
4.5
Recurrence
Each winter term
Version
1

Events

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

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

Prerequisites
None

Recommendation
None

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

Business Dynamics

Lecture (V)
2540531, WS 19/20, 2 SWS, Language: Deutsch, 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
6.43 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-INFO-102233 - Further Examinations
- 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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**Type of Examination:**
- Written examination

**Credits:** 4.5

**Recurrence:** Each winter term

**Version:** 1

**Competence Certificate**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

Students receive one aggregated grade consisting of a written exam (60%) and the Business Intelligence System challenge (40%). The exam and the Business Intelligence System challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Business Intelligence System challenge.

**Prerequisites**

None

**Recommendation**

Basic knowledge on database systems is helpful.

---

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

**Business Intelligence Systems**

2540422, WS 19/20, 3 SWS, Language: Englisch, [Open in study portal]

**Description**

In most modern enterprises, Business Intelligence Systems represent a core enabler of managerial decision making in that they are supplying up-to-date and accurate information about all relevant aspects of a company’s planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance.

The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of Business Intelligence Systems from a managerial and technical perspective. The lecture is complemented with a Business Intelligence System challenge, where students work with real-world data and enable system-based decision making using commercial Business Intelligence software packages.

**Learning Content**

- Conceptual Foundations
- Provisioning: ETL Process, Metadata, Data Warehouse & Data Marts and Big Data Technologies
- Consumption: Reporting, Dashboards and its relation to (Big Data) Analytics
- BI Strategy & Governance
- BI Implementation & Post-Implementation Management
- Business Intelligence System Challenge (in cooperation with industry partner)
Literature
Economist Intelligence Unit. 2015 “Big data evolution: Forging new corporate capabilities for the long term”
6.44 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-INFO-102233 - Further Examinations
M-WIWI-101410 - Business & Service Engineering
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-102806 - Service Innovation, Design & Engineering

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

Events
| SS 2019 | 2540456 | Internet Business Models | 2 SWS | Lecture (V) | Weinhardt, Peukert, Dann
| SS 2019 | 2540457 | Übungen zu Geschäftsmodellen im Internet: Planung und Umsetzung | 1 SWS | Practice (Ü) | Peukert, Dann

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015). 50% of the final grade is based on the written exam and 50% is based on assignments from the exercises. Further detailed information on grading is provided to students in the first lecture unit. Successful completion of the exercises is a prerequisite for admission to the written exam. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Prerequisites
None

Recommendation
None

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

Internet Business Models
2540456, SS 2019, 2 SWS, Language: Deutsch, Open in study portal
Lecture (V)

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.
6.45 Course: Business Planning [T-WIWI-102865]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101488 - Entrepreneurship (EnTechnon)

### Type
Examination of another type

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<td>Business Planning for Founders (ENTECH)</td>
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<td>2545020</td>
<td>Business Planning for Founders (EUCOR Edition)</td>
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### Competence Certificate

### Prerequisites
None

### Recommendation
None

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

#### Geschäftsplanung für Gründer (Track 1)

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<td>3</td>
<td>Each term</td>
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</table>

**Description**
This seminar introduces basic concepts of business planning for entrepreneurs to the participants. It focuses on practical concepts and hands-on-methods on how to turn business ideas into solid businesses (e.g. Business Modelling, Market Potential, Planning of Resources, and further more) and on the creation of a realistic and viable Business Plan (with or without Venture Capital).

**Annotation**

Please register on the seminar website.

WARNING: creditability in Seminar Module

The EnTechnon seminars are NOT accepted in the seminar module! The credit is only possible in MODULE ENTREPRENEURSHIP. OneException is the seminar "Entrepreneurship Research".
6.46 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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**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:

**Description**
This seminar introduces basic concepts of business planning for entrepreneurs to the participants. It focusses on practical concepts and hands-on methods on how to turn business ideas into solid businesses (e.g. Business Modelling, Market Potential, Planning of Ressorces, and further more) and on the creation of a realistic and viable Business Plan (with or without Venture Capital)

**Annotation**
Please register on the seminar website.

**WARNING:** creditability in Seminar Module

The EnTechnon seminars are NOT accepted in the seminar module! The credit is only possible in MODULE ENTREPRENEURSHIP. OneException is the seminar "Entrepreneurship Research".
Below you will find excerpts from events related to this course:

**Description**
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.

The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

**Learning Content**
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank’s success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management’s perspective.

The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank’s corporate policy.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.
Literature
Elective literature:

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer
6.48 Course: Case Studies Seminar: Innovation Management [T-WIWI-102852]

Responsible: Prof. Dr. Marion Weissenberger-Eibl
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101488 - Entrepreneurship (EnTechnon)
M-WIWI-101507 - Innovation Management
M-WIWI-101507 - Innovation Management

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Events

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Competence Certificate
Alternative exam assessments (§4(2), 3 SPO).

Prerequisites
None

Recommendation
Prior attendance of the course Innovation Management is recommended.

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

**Case studies seminar: Innovation management**
2545105, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal]

**Learning Content**
The objective of the seminar is to master selected concepts and methods of innovation management and then to apply these practically. Working in groups, the students apply the described concepts and methods of innovation management to a case study from the automotive industry to answer specific questions. Accordingly, the block seminar involves a switch from input to the application of this input. At the end, the results of the group work are presented in the form of a seminar paper and discussed by the whole course.

A short introduction to presentation techniques is planned to help students prepare the seminar papers.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.
Course: Challenges in Supply Chain Management [T-WIWI-102872]

Responsibility: Esther Mohr
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-102805 - Service Operations
M-WIWI-102808 - Digital Service Systems in Industry

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Competence Certificate
The assessment consists of a written paper and an oral exam of ca. 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

Prerequisites
None

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

Annotation
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

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

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

Challenges in Supply Chain Management
2550494, SS 2019, 3 SWS, Language: Englisch, Open in study portal Lecture (V)

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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**Events**

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<th>Lecture / Practice (VÜ)</th>
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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

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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: Deutsch, [Open in study portal](#)

Lecture (V)

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:

### Computational Complexity Theory, with a View Towards Cryptography

2400063, WS 19/20, 4 SWS, Language: Deutsch, [Open in study portal](#)

**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 FinTech with Python and C++ [T-WIWI-106496]

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-103261 - Disruptive FinTech Innovations

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**Type**
- Examination of another type

**Credits**
- 1.5

**Recurrence**
- Each summer term

**Version**
- 1

**Events**

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**Competence Certificate**
The grade is based on a larger or several smaller programming exercises.

**Prerequisites**
There are two conditions for taking this course:

1. This course is only open for registered students of the module “Disruptive FinTech Innovations”.
2. Registered students do also attend in the same semester the lecture “Engineering FinTech Solutions” and the seminar “Automated Financial Advisory”.

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

**Computational FinTech with Python and C++**
- 2530373, SS 2019, 1 SWS, Language: Englisch, [Open in study portal](#)

**Learning Content**
At the beginning of the semester, each student receives a personalized set of programming tasks.

**Workload**
Roughly 45 hours.
6.54 Course: Computational Geometry [T-INFO-104429]

**Responsible:** 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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6.55 Course: Computational Risk and Asset Management [T-WIWI-102878]

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-105032 - Data Science for Finance

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**Events**

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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: Englisch, [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.

**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.
6.56 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-INFO-102233 - Further Examinations  
M-WIWI-103247 - Intelligent Risk and Investment Advisory

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<tr>
<td>Written exam</td>
<td>4.5</td>
<td>Each winter term</td>
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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.
6.57 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-INFO-102233 - Further Examinations
- M-WIWI-103247 - Intelligent Risk and Investment Advisory

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<tr>
<td>Written examination</td>
<td>4.5</td>
<td>Each winter term</td>
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</table>

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“.
### Description
The course deals with contracts from the following areas:

- Contracts of programming, licencing and maintaining software
- Contracts in the field of IT employment law
- IT projects and IT Outsourcing
- Internet Contracts

From these areas single contracts will be chosen and discussed (e.g. software maintenance, employment contract with a software engineer). Concerning the respective contract the technical features, the economic background and the subsumption in the national law of obligation (BGB-Schuldrecht) will be discussed. As a result different contractual clauses will be developed by the students. Afterwards typical contracts and conditions will be analysed with regard to their legitimacy as standard business terms (AGB). It is the aim to show the effects of the german law of standard business terms (AGB-Recht) and to point out that contracts are a means of drafting business concepts and market appearance.

### Learning Content
It is the aim of this course to provide students with knowledge in the area of contract formation and formulation in practice that builds upon the knowledge the students have already acquired concerning the legal protection of computer programs. Students shall understand how the legal rules depend upon, and interact with, the economic background and the technical features of the subject. The contract drafts shall be prepared by the students and will be corporately completed during the lecture. It is the aim of the course that students will be able to formulate contracts by themselves.

### Literature
- Langenfeld, Gerrit Vertragsgestaltung Verlag C.H.Beck, III. Aufl. 2004
- Heusser, 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
6.59 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>24180</td>
<td>Computer Vision for Human-Computer Interaction</td>
<td>4</td>
<td>Lecture (V)</td>
<td>Stiefelhagen, Sarfraz</td>
</tr>
</tbody>
</table>

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

**Computer Vision for Human-Computer Interaction**

**24180, WS 19/20, 4 SWS, Language: Deutsch, Open in study portal**

**Lecture (V)**

**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

**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.
6.60 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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<tr>
<td>WS 19/20</td>
<td>24664</td>
<td>Praxis der Unternehmensberatung</td>
<td>Böhm, Lang</td>
</tr>
</tbody>
</table>

**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 clients’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.
6.61 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>SS 2019</td>
<td>24658</td>
<td>Context Sensitive Systems</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Riedel, Beigl</td>
</tr>
</tbody>
</table>
6.62 Course: Convex Analysis [T-WIWI-102856]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101473 - Mathematical Programming

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester. Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

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

Konvexe Analysis
2550120, SS 2019, SWS, Open in study portal

Learning Content
Convex Analysis deals with properties of convex functions and convex sets, in particular with respect to the minimization of convex functions over convex sets. That the involved functions are not necessarily assumed to be differentiable allows a number a applications which are not covered by techniques from smooth optimization, e.g. approximation problems with respect to the Manhattan or maximum norms, classification problems or the theory of statistical estimates. The lecture develops along another, geometrically simple example, where a nonsmooth obstacle set is to be described by a single smooth convex constraint such that minimal and maximal distances to the obstacle can be computed. The lecture is structured as follows:

- Introductory examples and terminology
- Convex subdifferential, Lipschitz continuity and the safety margin
- Normal cones, error bounds and the maximal distance

Literature
Elective literature:

### T 6.63 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>2 SWS</td>
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**Type:** Written examination  
**Credits:** 3  
**Recurrence:** Each term  
**Version:** 1
### 6.64 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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<td></td>
<td></td>
<td>Lecture (V)</td>
<td>Herzig</td>
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</table>
6.65 Course: Corporate Financial Policy [T-WIWI-102622]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-INFO-102233 - Further Examinations
- 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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<tr>
<td>Written exam</td>
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<td>see Annotations</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

**Annotation**
The course will exceptionally be held in the winter semester 2019/2020. Usually, however, the event takes place in the summer semester.
6.66 Course: Corporate Risk Management [T-WIWI-109050]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2
- M-WIWI-101502 - Economic Theory and its Application in Finance

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**Events**

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<td>SS 2019</td>
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<td>Corporate Risk Management</td>
<td>V</td>
<td>SWS</td>
<td>Lecture (V) Ruckes, Hoang</td>
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<td>SS 2019</td>
<td>2530219</td>
<td>Übung zu Corporate Risk Management</td>
<td>Ü</td>
<td>SWS</td>
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<td>WS 19/20</td>
<td>2530220</td>
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<td>SWS</td>
<td>Practice (Ü) Ruckes, Hoang, Silbereis</td>
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</table>

**Competence Certificate**

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The course is offered as a block course in the summer term.

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

**Corporate Risk Management**
2530218, SS 2019, SWS, Language: Englisch, Open in study portal

**Learning Content**

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

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

**Literature**

Übung zu Corporate Risk Management

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

6.67 Course: Country Manager Simulation [T-WIWI-106137]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M/INFO-102233 - Further Examinations
M/WIWI-101487 - Sales Management
M/WIWI-101490 - Marketing Management

Type: Examination of another type
Credits: 1.5
Recurrence: Each winter term
Version: 1

Events
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<td>WS 19/20</td>
<td>2572172</td>
<td>Country Manager</td>
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<td>Block (B)</td>
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</table>

Competence Certificate
Alternative exam assessment (30 minutes presentation) according to § 4 paragraph 2 Nr. 3 of the examination regulation SPO 2015.

Annotation
The course language is English. In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts. Please note that only one of the 1.5 ECTS courses can be chosen in this module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

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

Country Manager
2572172, WS 19/20, 1 SWS, Language: Englisch, Open in study portal

Learning Content
Understanding Culture
Understanding International Buyer Behavior
Market Entry Decisions
International Marketing and Sales Management (adaptation vs. differentiation)

Annotation
- The course language is English.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the 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.

Workload
Total workload for 1.5 ECTS: ca. 45 hours

Literature
6.68 Course: Credit Risk [T-WIWI-102645]

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

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

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

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**Events**

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<td>Credit Risk</td>
<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
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**Competence Certificate**
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date.

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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<tr>
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<tr>
<td>2530565</td>
<td>Credit Risk</td>
<td>Deutsch</td>
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</table>

**Description**
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

**Learning Content**
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed.

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


Elective literature:

**6.69 Course: Critical Information Infrastructures [T-WIWI-109248]**

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M/INFO-102233 - Further Examinations  
M/WIWI-104403 - Critical Digital Infrastructures

<table>
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<td>2511400</td>
<td>Critical Information Infrastructures</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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<td>WS 19/20</td>
<td>2511401</td>
<td>Übungen zu Critical Information Infrastructures</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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**Competence Certificate**  
The alternative exam assessment (§ 4(2), 3 SPO 2015) consists of
- the preparation of a written elaboration as well as
- an oral examination as part of a presentation of the work.

Details of the grades will be announced at the beginning of the course.

**Prerequisites**  
None.

**Annotation**  

_Below you will find excerpts from events related to this course:_

**Critical Information Infrastructures**  
2511400, WS 19/20, 2 SWS, Language: Deutsch/Englisch, [Open in study portal](#)  
Lecture (V)

**Description**  
The lecture critical information infrastructures introduces students to the world of these complex sociotechnical systems that permeate societies on a global scale. Students will learn to handle the complexities involved in the design, development, operation and evaluation of critical information infrastructures. In the beginning of the lecture, critical information infrastructures will be introduced on a general level. The following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. For example, students will learn how to continuously monitor and audit critical information infrastructures to ensure reliability and security. Likewise, students will get to know how to deal with cascading failures in interconnected infrastructures.
T 6.70 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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6.71 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-INFO-102233 - Further Examinations
- 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.
6.72 Course: Current Issues in the Insurance Industry [T-WIWI-102637]

**Responsible:** Wolf-Rüdiger Heilmann

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101449 - Insurance Management II

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**Competence Certificate**
The exam is offered latest in summer term 2016.
The assessment consists of a written exam (according to Section 4 (2), 1 of the examination regulation).
The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
For the understanding of this course knowledge of *Private and Social Insurance* [2530050] is required.

**Annotation**
Block course. For organizational reasons, please register with the secretary of the chair: thomas.mueller3@kit.edu.
### 6.73 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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### Events

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6.74 Course: Data Mining and Applications [T-WIWI-103066]

Responsible: Rheza Nakhaeizadeh
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101638 - Econometrics and Statistics I
M-WIWI-101639 - Econometrics and Statistics II

Events
SS 2019  2520375  Data Mining and Applications  2/4 SWS  Lecture (V)  Nakhaeizadeh

Competence Certificate

- Conduction of a larger empirical study in groups
- Reporting of milestones
- Final presentation (app. 45 minutes)

Prerequisites
None

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

Data Mining and Applications
2520375, SS 2019, 2/4 SWS, Language: Deutsch, Open in study portal

Learning Content
Part one: Data Mining
Why Data Mining?

- What is Data Mining?
- History of Data Mining
- Conferences and Journals on Data Mining
- Potential Applications
- Data Mining Process:
  - Business Understanding
  - Data Understanding
  - Data Preparation
  - Modeling
  - Evaluation
  - Deployment
- Interdisciplinary aspects of Data Mining
- Data Mining tasks
- Data Mining Algorithms (Decision Trees, Association Rules, Regression, Clustering, Neural Networks)
- Fuzzy Mining
- OLAP and Data Warehouse
- Data Mining Tools
- Trends in Data Mining

Part two: Examples of application of Data Mining

- Success parameters of Data Mining Projects
- Application in industry
- Application in Commerce
Workload

The total workload for this course is approximately 135 hours. For further information see German version.

Literature


- Jiawei Han, Micheline Kamber, Data Mining: Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
- David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining, MIT Press, Fall 2000
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**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-104045 - Data Privacy: From Anonymization to Access Control
6.76 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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6.77 Course: Data Protection Law [T-INFO-101303]

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<tr>
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<th>Prof. Dr. Nikolaus Marsch</th>
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| Part of               | M-INFO-101217 - Public Business Law  
                        | M-INFO-102233 - Further Examinations |

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| Events | | |
|--------| | |
| WS 19/20 | 24018 | Datenschutzrecht | 2 SWS | Lecture (V) | Marsch |
6.78 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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Information Engineering and Management M.Sc.  
Module Handbook as of 22.08.2019
6.79 Course: Database Systems and XML [T-WIWI-102661]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-INF-102233 - Further Examinations
M-WIWI-101456 - Intelligent Systems and Services
M-WIWI-101477 - Development of Business Information Systems

Type
Written examination

Credits
4.5

Recurrence
Each winter term

Version
2

Events

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<td>Practice (Ü)</td>
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Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

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

V Database Systems and XML
2511202, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal Lecture (V)

Learning Content
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

Workload
Lecture 30h
Exercise 15h
Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

Literature
- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Further literature will be given individually.
6.80 Course: Datamanagement in the Cloud [T-INFO-101306]

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

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100769 - Datamanagement in the Cloud
- 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

**Type:** Oral examination

**Credits:** 5

**Recurrence:** Irregular

**Version:** 1

**Prerequisites:**
none
# 6.81 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

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<td>Deep Learning and Neural Networks</td>
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<td>Waibel, Pham</td>
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</table>
6.82 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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Events

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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 2019, 2 SWS, Language: Deutsch, Open in study portal

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.
6.83 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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<td>Datenbankeinsatz</td>
<td>3 SWS</td>
<td>Lecture (V)</td>
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6.84 Course: Derivatives [T-WIWI-102643]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101480 - Finance 3
- M-WIWI-101482 - Finance 1
- M-WIWI-101483 - Finance 2

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**Events**

| SS 2019 | 2530550 | Derivatives | 2 SWS | Lecture (V) | Uhrig-Homburg |
| SS 2019 | 2530551 | Übungen zu Derivate | 1 SWS | Practice (Ü) | Uhrig-Homburg, Eska |

**Competence Certificate**
The success control takes place in form of a written examination (75min.) (according to §4(2), 1 SPOs). Details on the structure of the success control may be announced during the lecture. 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**
None

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

**Derivatives**

2530550, SS 2019, 2 SWS, Language: Deutsch, 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:**
Course: Design Thinking [T-WIWI-102866]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- 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.
6.86 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-INF-102233 - Further Examinations
M-WIWI-101488 - Entrepreneurship (EnTechnon)

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**Competence Certificate**

**Prerequisites**
None

**Recommendation**
As a recommendation to attending the seminar, basic knowledge about semantic technologies and concepts should be available. This may be acquired by attending one of the following lectures – Wissensmanagement, Semantic Web Technologies 1, Semantic Web Technologies 2 or by studying related literature. Furthermore the topic entrepreneurship should be of interest.
## 6.87 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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6.88 Course: Digital Health [T-WIWI-109246]

**Responsible:** Prof. Dr. Ali Sunyaev  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-104403 - Critical Digital Infrastructures

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**Events**

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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:

**Description**

The lecture “Digital Health” has a twofold purpose: first, to introduce theoretical foundations of various topics in digital health (they include, for instance, eHealth, health information systems, ambient assisted living, and smart homes in health care); and second, to introduce current topics in research on digital health (this includes for example genomics, gamification in health care, mobile health, and information privacy) by presenting papers and research projects the research group is working on. In addition, students are given the opportunity to combine the theoretical knowledge with real problems through a practical lecture.

**Workload**

4 ECTS = approx. 120 h.
6.89 Course: Digital Marketing and Sales in B2B [T-WIWI-106981]

Responsibility: Anja Konhäuser
Organisation: KIT Department of Economics and Management
Part of: M-INFOR-102233 - Further Examinations
M-WIWI-101487 - Sales Management

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Events

| WS 19/20 | 2572176 | Digital Marketing and Sales in B2B | 1 SWS | Others (sonst.) | Konhäuser |

Competence Certificate
Alternative exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation. (team presentation of a case study with subsequent discussion totalling 30 minutes).

Prerequisites
None.

Annotation
Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing and Sales (marketing.iism.kit.edu).
Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance can not be guaranteed.
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).
Please note that only one of the 1.5-ECTS courses can be attended in this module.

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

Digital Marketing and Sales in B2B
2572176, WS 19/20, 1 SWS, Language: Englisch, Open in study portal

Learning Content
Learning Sessions:
The class gives insights into digital marketing strategies as well as the effects and potential of different channels (e.g., SEO, SEA, Social Media). After an overview of possible activities and leverages in the digital marketing field, including their advantages and limits, the focus will turn to the B2B markets. There are certain requirements in digital strategy specific to the B2B market, particularly in relation to the value chain, sales management and customer support. Therefore, certain digital channels are more relevant for B2B marketing than for B2C marketing.
Once the digital marketing and tactics for the B2B markets are defined, further insights will be given regarding core elements of a digital strategy: device relevance (mobile, tablet), usability concepts, website appearance, app decision, market research and content management. A major advantage of digital marketing is the possibility of being able to track many aspects of user reactions and user behaviour. Therefore, an overview of key performance indicators (KPIs) will be discussed and relationships between these KPIs will be explained. To measure the effectiveness of digital activities, a digital report should be set up and connected to the performance numbers of the company (e.g., product sales) – within the course the setup of the KPI dashboard and combination of digital and non-digital measures will be shown to calculate the Return on Investment (RoI).

Presentation Sessions:
After the learning sessions, the students will form groups and work on digital strategies within a case study format. The presentation of the digital strategy will be in front of the class whereas the presentation will take 20 minutes followed by 10 minutes questions and answers.

Workload
time of presentness = 15 hrs.
private study = 30 hrs.
Literature
-
6.90 Course: Digital Service Design [T-WIWI-105773]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-102806 - Service Innovation, Design & Engineering
M-WIWI-104080 - Designing Interactive Information Systems

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Events

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<td>WS 19/20</td>
<td>Digital Service Design</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Mädche, Liu, Toreini</td>
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Competence Certificate

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.

Students receive one aggregated grade consisting of a written exam (60%) and the Digital Service Design challenge (40%). The exam and the Digital Service Design challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Digital Service Design challenge.

Prerequisites

None

Recommendation

None

Annotation

The course is held in English.

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

Digital Service Design

2540420, WS 19/20, 2 SWS, Language: Englisch, 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


6.91 Course: Digital Services: Business Models and Transformation [T-WIWI-110280]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101448 - Service Management
M-WIWI-102754 - Service Economics and Management

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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, IJOR, 36 (10), 1382-1406.
6.92 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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**Events**

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<td>2 SWS</td>
<td>Lecture (V) Hofheinz</td>
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</tbody>
</table>

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

**Digital Signatures**

**Learning Content**

Digital signatures are a fundamental primitive of modern cryptography. Their practical applications include, for instance, authenticated e-mail or certificate hierarchies on the internet.

This lecture will give an overview of important signature schemes with theoretical or practical relevance. This includes:

- One-time signatures, tree-based signatures, and chameleon hash functions
- RSA-based signatures
- Signatures in bilinear groups

Goal of this lecture is not only to describe these schemes, but also to discuss their security. Therefore we will introduce various security notions for digital signatures, and analyze whether the presented schemes provably meet these notions (under certain hardness assumptions).

Depending on the student’s preferences, the remaining time will be used to discuss advanced topics, such as:

- Schnorr signatures
- Programmable hash functions
- Tightness of reductions
- Analysis of hardness assumptions in the generic group model
### 6.93 Course: Digital Transformation and Business Models [T-WIWI-108875]

**Responsible:** Dr. Daniel Jeffrey Koch  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101507 - Innovation Management  
  M-WIWI-101507 - Innovation Management

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<td>2545103</td>
<td>Digitale Transformation und Geschäftsmodelle</td>
<td>2 SWS</td>
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**Competence Certificate**  
Non exam assessment (following §4(2) 3 of the examination regulation). The final grade is composed 75% of the grade of the written paper and 25% of the presentation.

**Prerequisites**  
None

**Recommendation**  
Prior attendance of the course Innovation Management is recommended.
6.94 Course: Digital Transformation of Organizations [T-WIWI-106201]

**Responsible:** Prof. Dr. Alexander Mädche
**Organisation:** KIT Department of Economics and Management
**Part of:**
- M-INFO-102233 - Further Examinations
- 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

**Events**

| SS 2019 | 2540556 | Digital Transformation of Organizations | 3 SWS | Lecture (V) | Mädche |

**Competence Certificate**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation. Students receive one aggregated grade consisting of a written exam (60%) and case study deliverable (40%). The exam and the case study need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the case study.

**Prerequisites**
None

**Annotation**
The course will be held in English.

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

**Digital Transformation of Organizations**
2540556, SS 2019, 3 SWS, Language: Englisch, [Open in study portal]

**Description**
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, IT is considered as key enabler of operational excellence ranging from the enrichment of routine working tasks (e.g., enterprise resource planning systems) to e-enabled integration of entire business eco-systems (e.g., e-supply chains). Complementing this primarily company-internal perspective on IT, we have recently 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 COURSES

Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

**6.95 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-INFO-102233 - Further Examinations  
M-WIWI-102805 - Service Operations  
M-WIWI-102832 - Operations Research in Supply Chain Management

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**Events**

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<td>Ereignisdiskrete Simulation in Produktion und Logistik</td>
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**Competence Certificate**
The assessment consists of a written paper and an oral exam of about 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

**Prerequisites**
None

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

**Annotation**
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.
The course is planned to be held every summer term.
The planned lectures and courses for the next three years are announced online.

_Below you will find excerpts from events related to this course:_

**Ereignisdiskrete Simulation in Produktion und Logistik**

2550488, SS 2019, 3 SWS, Language: Deutsch, Open in study portal

**Learning Content**
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

**Annotation**
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.
Besides knowledge of Operations Research students are assumed to be familiar with the following topics:

- Introduction in Statistics  
- Programming basics (algorithms and data structures)  
- Basic knowledge in production and logistics

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

### 6.96 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

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| Events                  |          |                  |         |         |
|-------------------------|----------|------------------|---------|
| WS 19/20                | 2400050  | Distributed Computing | 2 SWS  | Lecture (V) | Streit, Krauß, Kühn |
Course: Dynamic Macroeconomics [T-WIWI-109194]

Responsibility: 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

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Events

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<td>Dynamic Macroeconomics</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Scheffel</td>
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<td>WS 19/20</td>
<td>Übung zu Dynamic Macroeconomics</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

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

Dynamic Macroeconomics
2560402, WS 19/20, 2 SWS, Language: Englisch, 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.
**6.98 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-INFO-102233 - Further Examinations  
M-WIWI-101452 - Energy Economics and Technology

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<td>Lecture</td>
<td>2 SWS</td>
<td>Jochem, McKenna</td>
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**Competence Certificate**

See German version.

**Prerequisites**

None

**Recommendation**

None

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

**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.

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101480 - Finance 3  
M-WIWI-101486 - Market Engineering  

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<td>WS 19/20</td>
<td>2540454</td>
<td>eFinance: Information Systems for Securities Trading</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Weinhardt, Notheisen</td>
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<td>WS 19/20</td>
<td>2540455</td>
<td>Übungen zu eFinance: Wirtschaftsinformatik für den Wertpapierhandel</td>
<td>1</td>
<td>Practice (Ü)</td>
<td>Jaquart, Soufi</td>
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**Competence Certificate**

The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4(2), 3 SPO 2007 respectively §4(3) SPO 2015). 70% of the final grade is based on the written exam and 30% is based on assignments from the exercises. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

**Prerequisites**

see below

**Recommendation**

None

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

**Description**

The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

**Learning Content**

The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market 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:

6.100 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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<td>Each summer term</td>
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**Competence Certificate**

**Prerequisites**
None.

**Annotation**
The course is usually held as a block course.
### 6.101 Course: Emerging Trends in Internet Technologies [T-WIWI-110143]

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<th><strong>Responsible:</strong></th>
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<tr>
<td><strong>Part of:</strong></td>
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#### Competence Certificate

#### Prerequisites
None.

#### Annotation
The course is usually held as a block course.
6.102 Course: Emissions into the Environment [T-WIWI-102634]

Responsible: Ute Karl
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
          M-WIWI-101412 - Industrial Production III
          M-WIWI-101471 - Industrial Production II

Type: Written examination
Credits: 3.5
Recurrence: Each winter term
Version: 1

Events
| WS 19/20 | 2581962 | Emissions into the Environment | 2 SWS | Lecture (V) | Karl |

Competence Certificate
The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Recommendation
None

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

Emissions into the Environment
2581962, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal
Lecture (V)

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.
## 6.103 Course: Empirical Software Engineering [T-INFO-101335]

<table>
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<tr>
<th>Responsible</th>
<th>Prof. Dr. Walter Tichy</th>
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<td>KIT Department of Informatics</td>
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| Part of | M-INFO-101202 - Software Methods  
M-INFO-102233 - Further Examinations |

| Type | Oral examination |
| Credits | 4 |
| Recurrence | Each winter term |
| Version | 1 |

| Events |  
| WS 19/20 | 24156 | Empirische Softwaretechnik | 2 SWS | Lecture (V) | Tichy |
### Course: Employment Law I [T-INFO-101329]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101216 - Private Business Law  
- M-INFO-102233 - Further Examinations

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**Events**

- WS 19/20: 24167 Employment Law I 2 SWS Lecture (V) Hoff
### 6.105 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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</table>
6.106 Course: Energy and Environment [T-WIWI-102650]

**Responsible:** Ute Karl

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101452 - Energy Economics and Technology
- M-WIWI-101468 - Environmental Economics

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

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**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
None.

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

**Energy and Environment**
2581003, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Lecture (V)**

**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**
Ther references for further reading are included in the lecture documents (see ILIAS)
### 6.107 Course: Energy Market Engineering [T-WIWI-107501]

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-101446 - Market Engineering  
M-WIWI-103720 - eEnergy: Markets, Services and Systems

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<td>1 SWS</td>
<td>Practice (Ü)</td>
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**Competence Certificate**
The assessment consists of a written exam (60 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 2019, 2 SWS, Language: Deutsch, 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**
6.108 Course: Energy Networks and Regulation [T-WIWI-107503]

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-101446 - Market Engineering  
M-WIWI-103720 - eEnergy: Markets, Services and Systems

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**Competence Certificate**  
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation. The exam is offered every semester. Re-examinations are offered on every ordinary examination date.

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

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

**Energy Networks and Regulation**  
2540494, WS 19/20, 2 SWS, Open in study portal

**Learning Content**  
The lecture “Energy Networks and Regulation” provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead (“Energiewende”, redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO.
- Objectives of regulation: Fair price calculation and high standard access conditions.
- The functioning of incentive regulation
- Amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

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

**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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**Events**

| SS 2019 | 2581959 | Energy Policy | 2 SWS | Lecture (V) | Wietschel |

**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:

**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.

**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.
6.110 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-INFO-102233 - Further Examinations
M-WIWI-101452 - Energy Economics and Technology

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<td>Ardone, Keles</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

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: Englisch, Open in study portal

Learning Content
1. Overview and classification of energy systems modelling approaches
2. Usage of scenario techniques for energy systems analysis
3. Unit commitment of power plants
4. Interdependencies in energy economics
5. Scenario-based decision making in the energy sector
6. Visualisation and GIS techniques for decision support in the energy sector

Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.
6.111 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-INFO-102233 - Further Examinations  

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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

Recommendation

None

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

Energy Trade and Risk Management

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
6.12 Course: Engineering FinTech Solutions [T-WIWI-106193]

**Responsible:** Prof. Dr Maxim Ulrich

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-103247 - Intelligent Risk and Investment Advisory
- M-WIWI-103261 - Disruptive FinTech Innovations
- M-WIWI-105036 - FinTech Innovations

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**Competence Certificate**

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

**Prerequisites**

In order to take the course "Engineering FinTech Solutions", students must have completed the module "Data Science for Finance" with a grade of 1.3 or better.

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

**Description**

This project invites students to either pursue their own FinTech innovation project or to contribute to the Chair’s ongoing innovation projects.

**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.
# 6.113 Course: Entrepreneurial Leadership & Innovation Management [T-WIWI-102833]

**Responsible:** Prof. Dr. Orestis Terzidis  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101507 - Innovation Management

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**Competence Certificate**

**Prerequisites**
None

**Recommendation**
None
**6.114 Course: Entrepreneurship [T-WIWI-102864]**

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovation Management

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**Events**

| SS 2019 | 2545001 | Entrepreneurship | 2 SWS | Lecture (V) | Terzidis, Mitarbeiter |

**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
None

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

**Entrepreneurship**
2545001, SS 2019, 2 SWS, Language: Englisch, [Open in study portal]

**Description**
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of business planning. Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

**Learning Content**
This lecture, as an obligatory part of the module "Entrepreneurship", introduces basic concepts of entrepreneurship. It approaches the individual steps of dynamic corporate development. The focus here is the introduction to methods for generating innovative business ideas, the translation of patents into business concepts and general principles of financial planning. Other topics are the design and use of service-oriented information systems for founders, technology management, business model generation and lean startup methods for the implementation of business ideas in the way of controlled experiments in the market.

**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.
6.115 Course: Entrepreneurship Research [T-WIWI-102894]

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

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

**Part of:** M-INF-102233 - Further Examinations  
M-WIWI-101488 - Entrepreneurship (EnTechnon)  
M-WIWI-101488 - Entrepreneurship (EnTechnon)

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**Events**

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</table>

**Competence Certificate**
The performance review is done via a so-called performance review (term paper) (non-exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)). The final grade is a result from both, the grade of the term paper and its presentation, as well as active participation during the seminar.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The topics will be prepared in groups. The presentation of the results is done during a 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 2019, 2 SWS, Language: Deutsch, 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.
6.116 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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Events

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<td>Walz</td>
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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:

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
Course: Environmental Economics and Sustainability [T-WIWI-102615]

**Responsible:** Rainer Walz

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

**Part of:** M-WIWI-101468 - Environmental Economics

**Type** | **Credits** | **Recurrence** | **Version**
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Written examination | 5 | Each winter term | 1

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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].
6.118 Course: Environmental Law [T-INFO-101348]

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

**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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**Events**

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<td>Umweltrecht</td>
<td>2</td>
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</table>
6.119 Course: European and International Law [T-INFO-101312]

**Responsible:** Ulf Brühann

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101217 - Public Business Law
- M-INFO-102233 - Further Examinations

**Type**  
Written examination

**Credits**  
3

**Recurrence**  
Each summer term

**Version**  
1

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<td>Europäisches und Internationales Recht</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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6.120 Course: Experimental Economics [T-WIWI-102614]

Responsible: Prof. Dr. Christof Weinhardt

Organisation: KIT Department of Economics and Management

Part of:
- M/INFO-102233 - Further Examinations
- 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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Events

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<td>Übung zu Experimentelle Wirtschaftsforschung</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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Competence Certificate

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites

None

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

Experimental Economics

2540489, WS 19/20, 2 SWS, Language: Deutsch, 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.
6.121 Course: Extraordinary additional course in the module Cross-Functional Management Accounting [T-WIWI-108651]

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

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<td>Each term</td>
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Competence Certificate
The assessment depends on which extraordinary course becomes part of the module "Cross-Functional Management Accounting".

Prerequisites
None

Annotation
The purpose of this placeholder is to make it possible to include an extraordinary course in the module "Cross-Functional Management Accounting". Proposals for specific courses must be approved in advance by the module coordinator.
6.122 Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
        M-WIWI-102832 - Operations Research in Supply Chain Management

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<td>Each winter term</td>
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Competence Certificate
Due to a research semester of Professor Nickel in WS 19/20, the course "Facility Location and Strategic Supply Chain Management" does NOT take place in WS 19/20. In particular, neither WS 19/20 nor SS 20 will offer an exam for the lecture. The follow-up exam to the lecture in WS 18/19 takes place in SS 19 and is exclusively for students in the second examination.

The exam takes place in every semester.
Prerequisite for admission to examination is the successful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the successful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.
Course: Financial Analysis [T-WIWI-102900]

Responsibilities:
Dr. Torsten Luedecke

Organisation:
KIT Department of Economics and Management

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

Type: Written examination
Credits: 4.5
Recurrence: Each summer term
Version: 1

Events
| SS 2019 | 2530205 | Financial Analysis | 2 SWS | Lecture (V) | Luedecke |
| SS 2019 | 2530206 | Übungen zu Financial Analysis | 2 SWS | Practice (Ü) | Luedecke |

Competence Certificate
See German version.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance, accounting, and valuation is required.

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

Financial Analysis
2530205, SS 2019, 2 SWS, Language: Englisch, 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
Course: Financial Econometrics [T-WIWI-103064]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- 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...
Course: Financial Intermediation [T-WIWI-102623]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-101480 - Finance 3
- M-WIWI-101483 - Finance 2
- M-WIWI-101502 - Economic Theory and its Application in Finance

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 1

**Events**

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<td>Financial Intermediation</td>
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<td>Lecture (V)</td>
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<td>WS 19/20</td>
<td>2530233</td>
<td>Übung zu Finanzintermediation</td>
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<td>Practice (Ü)</td>
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<td>Ruckes, Hoang, Benz</td>
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</table>

**Competence Certificate**
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins. The exam is offered each semester.

**Prerequisites**
None

**Recommendation**
None

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

**Financial Intermediation**
2530232, WS 19/20, 2 SWS, Language: Deutsch, 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:
6.126 Course: Firm creation in IT security [T-WIWI-110374]

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

Type: Examination of another type
Credits: 3
Recurrence: Irregular
Version: 1

Competence Certificate
Alternative exam assessments (§4(2), 3 SPO 2015). The grade consists of the presentation and the written elaboration.

Prerequisites
None
### Course: Fixed Income Securities [T-WIWI-102644]

**Responsible:** Prof. Dr. Marliese Uhrig-Homburg  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101480 - Finance 3  
- M-WIWI-101483 - Finance 2

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#### Events

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<td>2 SWS</td>
<td>Lecture (V)</td>
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**Competence Certificate**

The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO2015 and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date. A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

**Prerequisites**

None

**Recommendation**

Knowledge from the course "Derivatives" is very helpful.

**Annotation**

The course is offered as a block course.

---

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

### Fixed Income Securities

2530260, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Description**

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.

**Learning Content**

The lecture deals with both German and international bond markets, which are an important source of funding for both the corporate and the public sector. After an overview of the most important bond markets, various definitions of return are discussed. Based on that, the concept of the yield curve is presented. The modelling of the dynamics of the term structure of interest rates provides the theoretical foundation for the valuation of interest rate derivatives, which is discussed in the last part of the lecture.

**Workload**

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


Elective literature:

### 6.128 Course: Formal Systems [T-INFO-101336]

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**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>Formale Systeme</td>
<td>4 SWS</td>
<td>Lecture / Practice (VÜ)</td>
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**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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- **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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6.131 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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6.132 Course: Global Optimization I [T-WIWI-102726]

 Responsible: Prof. Dr. Oliver Stein
 Organisation: KIT Department of Economics and Management
 Part of: M-INFO-102233 - Further Examinations
 M-WIWI-101473 - Mathematical Programming

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Events

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<td>2 SWS</td>
<td>Lecture (V) Stein</td>
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<td>SS 2019 2550135</td>
<td>Übungen zu Globale Optimierung I+II</td>
<td>1 SWS</td>
<td>Practice (Ü) Stein</td>
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Competence Certificate
Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO) and possibly of a compulsory prerequisite. The exam is offered in the lecture of semester and the following semester. The success check can be done also with the success control for “Global optimization II”. In this case, the duration of the written exam is 120 min.

Prerequisites
None

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the same semester.

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

V Globale Optimierung I
2550134, SS 2019, 2 SWS,
Lecture (V)
Open in study portal

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.
Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
6.133 Course: Global Optimization I and II [T-WIWI-103638]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101473 - Mathematical Programming

Type: Written examination
Credits: 9
Recurrence: Each summer term
Version: 1

Events
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<td>SS 2019</td>
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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 and possibly of a compulsory prerequisite.
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.

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

V Globale Optimierung I
2550134, SS 2019, 2 SWS, Open in study portal

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.
The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
- W. Alt Numerische Verfahren der konvexen, nichtglatten Optimierung Teubner 2004
- C.A. Floudas Deterministic Global Optimization Kluwer 2000
- R. Horst, H. Tuy Global Optimization Springer 1996
Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture.

Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
- W. Alt Numerische Verfahren der konvexen, nichtglatten Optimierung Teubner 2004
- C.A. Floudas Deterministic Global Optimization Kluwer 2000
- R. Horst, H. Tuy Global Optimization Springer 1996
Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of “Global optimization I”. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

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:

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

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- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature
- W. Alt Numerische Verfahren der konvexen, nichtglatten Optimierung Teubner 2004
- C.A. Floudas Deterministic Global Optimization Kluwer 2000
- R. Horst, H. Tuy Global Optimization Springer 1996
6.135 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-INF-102233 - Further Examinations
- 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
- Irregular

### Version
- 2

### 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.
Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101452 - Energy Economics and Technology

Type: Written examination
Credits: 3
Recurrence: Each summer term
Version: 1

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.
# Human Factors in Security and Privacy [T-WIWI-109270]

**Responsible:** Prof. Dr. Melanie Volkamer  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M/INFO-102233 - Further Examinations  
M-WIWI-104520 - Human Factors in Security and Privacy

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<tr>
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<td>Lecture (V)</td>
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<td>WS 19/20</td>
<td>Übungen zu Human Factors in Security and Privacy</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Volkamer, Reinheimer</td>
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**Competence Certificate**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation. The exam takes place every semester and can be repeated at every regular examination date.

**Prerequisites**
Successful participation in the exercises.

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

## Human Factors in Security and Privacy
2511554, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Lecture (V)**

**Description**
The history of information security and privacy has taught us that it takes more than technological innovation to develop effective security and privacy mechanisms: Many aspects of information security and privacy actually depend on both technical and human factors. As a result of focusing on the technical factors, we are seeing a persistent gap between theoretical security and actual security in real world which becomes an increasing problem in the age of digitalization. The gap is mainly caused by strong and actually unrealistic assumptions regarding the users’ knowledge and behavior.

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

‘Human factors in security & privacy’ research areas are:

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

This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more-effective awareness/education/training approaches. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study.
Learning Content
This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. This includes the importance of mental models. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is also applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study.

Literature
- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
## 6.138 Course: Human-Machine-Interaction [T-INFO-101266]

**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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<th>SWS</th>
<th>Lecture (V)</th>
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<tr>
<td>SS 2019</td>
<td>24659</td>
<td>Human-Computer-Interaction</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Beigl</td>
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</table>
6.139 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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<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Beigl, Exler</td>
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<td>SS 2019</td>
<td>24659</td>
<td>Human-Computer-Interaction</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Beigl</td>
</tr>
</tbody>
</table>
6.140 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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<tr>
<td>WS 19/20</td>
<td>2400112</td>
<td>Lecture (V)</td>
<td>2 SWS</td>
<td>Beyerer, Pak</td>
<td></td>
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</table>

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

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).
6.141 Course: Incentives in Organizations [T-WIWI-105781]

**Responsible:** Prof. Dr. Petra Nieken

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-101500 - Microeconomic Theory
- M-WIWI-101505 - Experimental Economics
- M-WIWI-101510 - Cross-Functional Management Accounting

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

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

In case of a small number of registrations, we might offer an oral exam instead of a written exam.

**Prerequisites**
None

**Recommendation**
Knowledge of microeconomics, game theory, and statistics is assumed.

**Annotation**
The course is carried out routinely in summer.

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

**V Incentives in Organizations**
2573003, SS 2019, 2 SWS, Language: Englisch, [Open in study portal]

**Lecture (V)**

**Notes**
See Module Handbook
6 COURSES

6.142 Course: Industrial Services [T-WIWI-102822]

Responsible: Prof. Dr. Hansjörg Fromm
Organisation: KIT Department of Economics and Management

Part of:
- M-INFO-102233 - Further Examinations
- M-WIWI-101448 - Service Management
- M-WIWI-101506 - Service Analytics
- M-WIWI-102808 - Digital Service Systems in Industry

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Events

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<td>2 SWS</td>
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<td>WS 19/20</td>
<td>Übungen zu Industrial Services</td>
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Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None

Recommendation
None

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

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 COURSES

Course: Information Service Engineering [T-WIWI-106423]

6.143 Course: Information Service Engineering [T-WIWI-106423]

Responsible:  Prof. Dr. Harald Sack
Organisation:  KIT Department of Economics and Management
Part of:  M-INFO-102233 - Further Examinations
          M-WIWI-101456 - Intelligent Systems and Services

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Events

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<th>Information Service Engineering</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Sack</th>
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<td>SS 2019</td>
<td>2511607</td>
<td>Übungen zu Information Service Engineering</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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Competence Certificate

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

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

Prerequisites

None

Annotation

New course starting summer term 2017.

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

V Information Service Engineering
2511606, SS 2019, 2 SWS, Language: Englisch, Open in study portal

Lecture (V)
Learning Content
- Information, Natural Language and the Web
- Natural Language Processing
  - NLP and Basic Linguistic Knowledge
  - NLP Applications, Techniques & Challenges
  - Evaluation, Precision and Recall
  - Regular Expressions and Automata
  - Tokenization
  - Language Model and N-Grams
  - Part-of-Speech Tagging
- Linked Data Engineering
  - Knowledge Representations and Ontologies
  - What’s in an URI?
  - Resource Description Framework (RDF)
  - Creating new Models with RDF
  - Querying RDF(S) with SPARQL
  - More Expressivity with Web Ontology Language (OWL)
  - The Web of Data
  - Vocabularies and Ontologies in the Web of Data
  - Wikipedia, DBpedia, and Wikidata
- Information Retrieval
  - Information Retrieval Models
  - Retrieval Evaluation
  - Web Information Retrieval
  - Document Crawling, Text Processing, and Indexing
  - Query Processing and Result Representation
  - Question Answering
- Knowledge Mining
  - From Data to Knowledge
  - Data Mining
  - Machine Learning Basics for Knowledge Mining
  - Mining Knowledge from Wikipedia
  - Named Entity Resolution
- Exploratory Search and Recommender Systems
  - Semantic Search and Entity Centric Search
  - Collaborative Filtering and Content Based Recommendations
  - From Search to Intelligent Browsing
  - Linked Data Based Exploratory Search
  - Fact Ranking

Annotation
New lecture, since summer semester 2017

Literature

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101488 - Entrepreneurship (EnTechnon)
- M-WIWI-101507 - Innovation Management

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**Events**


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

**Prerequisites**
None

**Recommendation**
None

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

**Innovation Management: Concepts, Strategies and Methods**

Notes
The lecture will be held in German.

Learning Content
The course ‘Innovation Management: Concepts, Strategies and Methods’ offers scientific concepts which facilitate the understanding of the different phases of the innovation process and resulting strategies and appropriate methodologies suitable for application.

The concepts refer to the entire innovation process so that an integrated perspective is made possible. This is the basis for the teaching of strategies and methods which 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.

**Responsible:** Dr. Daniela Beyer

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

**Part of:**
- M-WIWI-101507 - Innovation Management
- M-WIWI-101507 - Innovation Management

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<td>Irregular</td>
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**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.
**Course: Innovationtheory 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

### 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>SS 2019</td>
<td>Übung zu Innovationstheorie und -politik</td>
<td>SWS</td>
<td>Practice (Ü)</td>
<td>Ott, Eraydin</td>
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#### Competence Certificate
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

#### Prerequisites
None

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

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

**Innovationtheory and-policy**  
2560236, SS 2019, SWS, Language: Deutsch, [Open in study portal](#)

#### Learning Content
- Incentives for the emergence of innovations  
- Patents  
- Diffusion  
- Impact of technological progress  
- Innovation Policy

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

#### Literature

Excerpt:
6.147 Course: Insurance Marketing [T-WIWI-102601]

**Responsible:** Edmund Schwake

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

**Part of:** M-INFO-102233 - Further Examinations  
   M-WIWI-101449 - Insurance Management II

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<td>Each summer term</td>
<td>1</td>
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</table>

**Competence Certificate**

The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).

The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

**Prerequisites**

None

**Recommendation**

None
### 6.148 Course: Insurance Production [T-WIWI-102648]

**Responsible:** Prof. Dr. Ute Werner  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-101449 - Insurance Management II

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#### Competence Certificate
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation). The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

T-WIWI-102648 Insurance Production will be offered latest until summer term 2017 (beginners only).

#### Prerequisites
None

#### Recommendation
None

#### Annotation
This course is offered on demand. For further information, see: [http://insurance.fbv.kit.edu](http://insurance.fbv.kit.edu)
6.149 Course: Insurance Risk Management [T-WIWI-102636]

**Responsible:** Harald Maser  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101449 - Insurance Management II

### Type Credits Recurrence Version
- Written examination 2.5 Each summer term 1

**Competence Certificate**
The assessment consists of a written or an oral exam (according to Section 4 (2), 1 or 2 of the examination regulation).

T-WIWI-102636 Insurance Risk Management will be offered as a seminar starting summer term 2017. The examination will be offered latest until summer term 2017 (beginners only).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
Block course. For organizational reasons, please register with the secretary of the chair: thomas.mueller3@kit.edu.
### 6.150 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

**Type:** Oral examination  
**Credits:** 4  
**Recurrence:** Each summer term  
**Version:** 1

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<td>2 SWS</td>
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6 COURSES

6.151 Course: Intelligent CRM Architectures [T-WIWI-103549]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
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 Infrastructures

2540525, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Learning Content

The lecture is structured in three parts:

In the first part the methods used for architecture design are introduced (system analysis, UML, formal specification of interfaces, software and analysis patterns, and the separation in conceptual and IT-architectures. The second part is dedicated to learning architectures and machine learning methods. The third part presents examples of learning CRM-Architectures.

Workload

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance

- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study

- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m
Literature

6.152 Course: Interactive Information Systems [T-WIWI-108461]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-104068 - Information Systems in Organizations
- M-WIWI-104080 - Designing Interactive Information Systems

**Type**
Examination of another type

**Credits**
4.5

**Recurrence**
Each summer term

**Version**
3

**Events**

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**Competence Certificate**
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation. Students receive one aggregated grade consisting of a written exam (70%) and research paper (30%). The exam and the research paper need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the research paper.

**Prerequisites**
None

**Annotation**
This course replaces T-WIWI-106342 "Interactive Systems" starting summer term 2018.
The course is held in English.

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

**Interactive Systems**
2540558, SS 2019, 3 SWS, Language: Englisch, Open in study portal

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

With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. The aim of this course is to introduce the foundations, theoretical grounding, key concepts and principles as well as current practice of interactive systems. The contents of the course abstract from the technical implementation details. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

**Notes**
The lecture is complemented with a capstone project assignment, where students analyze and review existing interactive systems and suggest areas of improvement / extensions.

**Learning Content**
- Basics
- Theoretical foundations
- Key concepts and design principles for specific interactive systems classes
- Capstone project
Literature
The lecture bases to a large extend on


Additional literature will be provided in the lecture.
Course: International Finance [T-WIWI-102646]

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

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

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

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**Events**

| SS 2019 | 2530570 | International Finance | 2 SWS | Lecture (V) | Walter, Uhrig-Homburg |

**Competence Certificate**

See German version.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

See German version.

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

**International Finance**

2530570, SS 2019, 2 SWS, Language: Deutsch, 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 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 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:**

### Course: International Management in Engineering and Production [T-WIWI-102882]

**Responsible:** Dr. Henning Sasse  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101412 - Industrial Production III  
- M-WIWI-101471 - Industrial Production II

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<td>Each winter term</td>
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**Competence Certificate**

The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

None

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

**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.

Responsible: Eric Casernave
Prof. Dr. Martin Klarmann

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101487 - Sales Management
M-WIWI-101488 - Entrepreneurship (EnTechnon)

Type
Examination of another type

Credits
3

Recurrence
Once

Version
1

Events
WS 19/20 2572179 International Selling – EUCOR 2 SWS Block (B) Klarmann

Competence Certificate
Non exam assessment according to § 4 paragraph 2 Nr. 3 of the examination regulation (presentation). The grade is based on the presentation and the subsequent discussion.

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

Annotation
This course is open to participants of the EUCOR programme.
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: Englisch, 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".

Annotation
- This event is open to participants of the EUCOR programme.
- 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.

Workload
Total workload for 3 ECTS: about 90 hours
6.156 Course: Internet Law [T-INFO-101307]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: M-INFO-101215 - Intellectual Property Law
M-INFO-102233 - Further Examinations

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6.157 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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<td>2 SWS Lecture (V) Friebe, Jung, Zitterbart</td>
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**6.158 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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### 6.159 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

**Responsible:** Prof. Dr. Steffen Rebennack  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- 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 semester.

**Prerequisites**  
None.
### 6.160 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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6.161 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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| | Lecture / Practice (VU) | Version |
| | Hartenstein, Grashöfer, Neudecker | 1 |
6.163 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.
6.164 Course: Knowledge Discovery [T-WIWI-102666]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101456 - Intelligent Systems and Services
- M-WIWI-102827 - Service Computing

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**Events**

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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: Englisch, [Open in study portal](#)

**Lecture (V)**

**Description**

Knowledge discovery is a well-established field with a large community investigating methods for the discovery of patterns and regularities in large data sets, including relational databases and unstructured text.

A variety of methods are available to assist in extracting patterns that, if interpreted, provide valuable, possibly previously unknown, insights. This information can be predictive or descriptive in nature.

This lecture provides an overview of this field. The lecture imparts specific techniques and methods, challenges and current and future research work in this field.

**Learning Content**

Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empirical evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others featurevector-based learning, text mining and social network analysis.

**Workload**

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours

**Literature**

- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley
### Description
Multiple exercises are held that capture the topics, held in the lecture Knowledge Discovery, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

### Learning Content
Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empirical evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others featurevector-based learning, text mining and social network analysis.

### Workload
The total workload for the lecture Knowledge Discovery is given out on the description of the lecture.

### Literature
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining. 2005, Addison Wesley
6.165 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: Deutsch, [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.
6.166 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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</table>
6.167 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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Below you will find excerpts from events related to this course:

**Practical Course in Algorithm Design**  
24305, WS 19/20, 4 SWS, Language: Deutsch, Open in study portal

**Workload**  
150 h
6.168 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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<td>Lecture (V)</td>
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Below you will find excerpts from events related to this course:

**Language Technology and Compiler**

24661, SS 2019, 4 SWS, Language: Deutsch, [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
6.169 Course: Large-scale Optimization [T-WIWI-106549]

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

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

**Part of:**
- M-INF-102233 - Further Examinations
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

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<td>Practice (Ü)</td>
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**Competence Certificate**
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester.

**Prerequisites**
None.
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

**Type:** Written examination

**Credits:** 3

**Recurrence:** Each term

**Version:** 1

### Events

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<th>Lecture (V)</th>
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Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
6 COURSES

Course: Liberalised Power Markets [T-WIWI-107043]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
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 exam according to Section 4(2), 1 of the examination regulation.

Prerequisites
See German version.

Recommendation
None

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

Liberalised Power Markets
2581998, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Learning Content
1. The European liberalisation process
   1.1 The concept of a competitive market
   1.2 The regulated market
   1.3 Deregulation in Europe
2. Pricing and investments in a liberalised power market
   2.1 Merit order
   2.2 Prices and investments
   2.3 Market flaws and market failure
   2.4 Regulation in liberalised markets
   2.5 Additional regulation mechanisms
3. The power market and the corresponding submarkets
   3.1 List of submarkets
   3.2 Types of submarkets
   3.3 Market rules
4. Risk management
   4.1 Uncertainties in a liberalised market
   4.2 Investment decisions under uncertainty
   4.3 Estimating future electricity prices
4.4 Portfolio management
5. Market power
   5.1 Defining market power
   5.2 Indicators of market power
   5.3 Reducing market power
6. Market structures in the value chain of the power sector

Annotation
The course "Basics of Liberalised Energy Markets" [2581998] will be reduced to 3 credits in winter term 2015/2016 and the tutorial [2581999] is no longer offered.
Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Elective literature:
6.172 Course: Life Cycle Assessment [T-WIWI-110512]

Responsible: Prof. Dr. Frank Schultmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

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<td>2 SWS</td>
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Competence Certificate
The assessment consists of an oral exam (30 min.) or a written exam (60 min.).

Prerequisites
None.

Recommendation
None

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

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

**Machine Learning 1 - Fundamental Methods**

2511500, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

**Description**

The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

**Learning Content**

The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.
Literature
The slides are available as a PDF

Related Literature
- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Further (specific) literature on individual topics will be given in the lecture.
Below you will find excerpts from events related to this course:

**Machine Learning 2 - Advanced methods**

2511502, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Description**

The field of machine decision-making and inference procedures, taking into account uncertainties and incomplete knowledge, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The focus of this lecture is on the embedding and application of machine-learning methods in decision and inference systems starting with methods of dimension reduction, feature selection/evaluation via semi-supervised learning to methods of probabilistic inference (e.g. Dempster Shafer information fusion, dynamic and object-oriented Bayesian networks, POMDP, etc).

The lecture introduces the basic principles and structures and explains algorithms developed so far. The structure and operation of the procedures and methods are presented and explained using a number of application scenarios, in particular from the field of technical (semi-)autonomous systems.

**Notes**

The first exercise will take place on 08.05.2019.

**Learning Content**

The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).
**Literature**
The slides are available as a PDF

**Related Literature**
- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Further (specific) literature on individual topics will be given in the lecture.

**Exercises for Machine Learning 2 - Advanced Methods**
2511503, SS 2019, 1 SWS, [Open in study portal](link)

**Notes**
The first exercise will take place on 08.05.2019.
6.175 Course: Management Accounting 1 [T-WIWI-102800]

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

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

**Part of:** M/INFO-102233 - Further Examinations
M/WIWI-101498 - Management Accounting

### Type
- Written examination

### Credits
- Credits: 4.5

### Recurrence
- Each summer term

### Version
- Version: 2

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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 2019, 2 SWS, Language: Englisch, Open in study portal

**Notes**
see Module Handbook

**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**
- 2579901, SS 2019, 2 SWS, Language: Englisch, Open in study portal
Notes
see Module Handbook
6 COURSES

Course: Management Accounting 2 [T-WIWI-102801]

6.176 Course: Management Accounting 2 [T-WIWI-102801]

| Responsible: | Prof. Dr. Marcus Wouters |
| Organisation: | KIT Department of Economics and Management |
| Part of: | M-INFO-102233 - Further Examinations |
| | M-WIWI-101498 - Management Accounting |

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| Events | Credits | Recurrence | Type | Code | | |
|--------|---------|------------|------|------| | |
| WS 19/20 | 2 SWS | Lecture (V) | Management Accounting 2 | 2579903 | Wouters |
| WS 19/20 | 2 SWS | Practice (Ü) | Management Accounting 2 | 2579904 | Ebinger |
| WS 19/20 | 2 SWS | Practice (Ü) | Management Accounting 2 | 2579905 | Ebinger |

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester.

Prerequisites
None

Recommendation
It is recommended to take part in the course "Management Accounting 1" before this course.

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 2
2579903, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Notes
see Module Handbook

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.
2579904, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Notes
see Module Handbook

2579905, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Notes
see Module Handbook
6.177 Course: Management of IT-Projects [T-WIWI-102667]

**Responsible:** Dr. Roland Schätzle

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

**Part of:**
- M-INFO-102233 - Further Examinations
- 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) in the first week after lecture period according to Section 4(2), 1 of the examination regulation.

**Prerequisites**
None.

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

**Management of IT-Projects**
2511214, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Lecture (V)**

**Learning Content**
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructure
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

**Workload**
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam &1h

Total: 150h
Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004

Further literature is given in each lecture individually.
Course: Managing New Technologies [T-WIWI-102612]

Responsible: Dr. Thomas Reiß
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101488 - Entrepreneurship (EnTechnon)

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Competence Certificate
Written exam 100% following §4, Abs. 2.

Prerequisites
None

Recommendation
None

Annotation
The credit points for T-WIWI-102612 "Management of New Technologies" were reduced to 3 credit points in the 2019 summer semester.

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

Learning Content
The course provides an overview of the international development of a selected number of key technologies such as biotechnology, nanotechnology, neurotechnologies, converging technologies. Methods for monitoring new technologies including foresight approaches will be presented and the economic and social impacts of new technologies will be discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle: Gabler Lexikon Technologiemanagement
Course: Market Engineering: Information in Institutions [T-WIWI-102640]

**Responsibility:** Prof. Dr. Christof Weinhardt

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

**Part of:**
- M-INF-102233 - Further Examinations
- 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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**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**

Lecture (V)

2540460, SS 2019, 2 SWS, Language: Englisch, [Open in study portal](#)

**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

6.180 Course: Market Research [T-WIWI-107720]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- 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

**Type:** Written examination

**Credits:** 4,5

**Recurrence:** Each summer term

**Version:** 1

### Events

| SS 2019 | 2571150 | Market Research | 2 SWS | Lecture (V) | Klarmann |
| SS 2019 | 2571151 | Market Research Tutorial | 1 SWS | Practice (Ü) | Honold |

**Competence Certificate**

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**

None

**Recommendation**

None

**Annotation**

Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

---

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

**Market Research**

2571150, SS 2019, 2 SWS, Language: Englisch, [Open in study portal](#)

**Learning Content**

Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategic decision making

**Annotation**

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

**Workload**

The total workload for this course is approximately 135.0 hours.

- Presence time: 30 hours
- Preparation and wrap-up of the course: 45.0 hours
- Exam and exam preparation: 60.0 hours
Literature
6.181 Course: Marketing Analytics [T-WIWI-103139]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101647 - Data Science: Evidence-based Marketing

---

**Type:**
- Written examination

**Credits:** 4.5

**Recurrence:** Each winter term

**Version:** 4

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**Events**

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**Competence Certificate**

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

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**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: Englisch, Open in study portal

**Lecture (V)**

---

**Learning Content**

In this course various relevant market research questions are addressed, as for example measuring and understanding customer attitudes, preparing strategic decisions and sales forecasting. In order to analyze these questions, students learn to handle social media data, panel data, nested observations and experimental design. To analyze the data, advanced methods, as for example multilevel modeling, structural equation modeling and return on marketing models are taught. Also, problems of causality are addressed in-depth. The lecture is accompanied by a computer-based exercise, in the course of which the methods are applied practically.

---

**Annotation**

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

Exchange students can bypass the requirement of passing Market Research if they can prove that they possess sufficient statistical knowledge based on courses attended at their home institution. This will be examined individually by the Marketing & Sales Research Group.

---

**Workload**

Total workload for 4.5 ECTS: ca. 135 hours
Literature

- Cameron, A. Colin, Trivedi, Pravin K. (2005), Microeconometrics: methods and applications, New York.
- Chapman, Christopher, Feit, Elea M. (2015), R for Marketing Research and Analytics, Cham.
6.182 Course: Marketing Strategy Business Game [T-WIWI-102835]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101490 - Marketing Management
- M-WIWI-101510 - Cross-Functional Management Accounting

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**Events**

| SS 2019 | 2571183 | Marketing Strategy Business Game | 1 SWS | Block (B) | Klarmann, Assistenten |

**Competence Certificate**


**Prerequisites**

None

**Recommendation**

None

**Annotation**

Please note that only one of the courses from the election block can be chosen in the module.

Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS points in the respective module to all students. Participation in a specific course cannot be guaranteed.

In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

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

**Marketing Strategy Business Game**

2571183, SS 2019, 1 SWS, Language: Deutsch, Open in study portal

**Learning Content**

Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups' companies.

**Annotation**

- Please note that only one of the 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.

**Workload**

The total workload for this course is approximately 45.0 hours. For further information see German version.

**Literature**

6.183 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
6.184 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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**Information Engineering and Management M.Sc.**

Module Handbook as of 22.08.2019
Course: Meshes and Point Clouds [T-INFO-101349]

**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

**Type**
- Oral examination

**Credits**
- 3

**Recurrence**
- Each term

**Version**
- 1

**Events**

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**6.186 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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**Competence Certificate**
Non exam assessment according to § 4 paragraph 3 of the examination regulation (SPO 2015).

**Prerequisites**
None

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

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

**Methods in Economic Dynamics**  
2560240, SS 2019, SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**
The workshop offers the possibility to deepen the understanding about different aspects of theoretical modelling of innovation-based growth and induced economic effects. This includes the implementation of formal models in computer algebra systems as well as recording, processing and econometric analysis of related data from relational databases (concerning for example patents or trademarks). Moreover, methods of network theory are discussed.

**Annotation**
The course has been added summer 2015.

**Workload**
The total workload for this course is approximately 45 hours.
Lecture: 15h  
Preparation of lecture/exam: 30h
6.187 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

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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.
6 COURSES

Course: Mixed Integer Programming I [T-WIWI-102719]

6.188 Course: Mixed Integer Programming I [T-WIWI-102719]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
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 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:

Learning Content
Many optimization problems from economics, engineering and natural sciences are modeled with continuous as well as discrete variables. Examples are the energy minimal design of a chemical process in which several reactors may be switched on or off, or the time minimal covering of a distance with a vehicle equipped with a gear shift. While optimal points can be defined straightforwardly, for their numerical identification an interplay of ideas from discrete and continuous optimization is necessary.

The lecture treats methods for the numerical solution of linear optimization problems which depend on continuous as well as discrete variables. It is structured as follows:

- Existence results and concepts of linear as well as convex optimization
- LP relaxation and error bounds for rounding
- Gomory's cutting plane method
- Benders decomposition

Part II of the lecture treats nonlinear mixed integer programs.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.
Literature

- J. Kallrath: Gemischt-ganzzahlige Optimierung, Vieweg, 2002
- D. Li, X. Sun: Nonlinear Integer Programming, Springer, 2006
### 6.189 Course: Mixed Integer Programming II [T-WIWI-102720]

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#### Responsible
Prof. Dr. Oliver Stein

#### Organisation
KIT Department of Economics and Management

#### Part of
- M-INFO-102233 - Further Examinations
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

#### 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).
### 6.190 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 |

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<td>Jung, Waldhorst</td>
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6.191 Course: Model Driven Software Development [T-INFO-101278]

**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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Burger
6.192 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-INFO-102233 - Further Examinations
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

Events

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Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). 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 2019, 2 SWS, Language: Deutsch, 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**


6.193 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-INFO-102233 - Further Examinations
- M-WIWI-102808 - Digital Service Systems in Industry
- M-WIWI-102832 - Operations Research in Supply Chain Management

<table>
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**Events**

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<td>2550490</td>
<td>Modellieren und OR-Software: Fortgeschrittene Themen</td>
<td>3 SWS</td>
<td>Practical course (P)</td>
<td>Pomes, Zander, Bakker</td>
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</table>

**Competence Certificate**

The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the software laboratory and the following term.

**Prerequisites**

None.

**Recommendation**

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

Successful completion of the course Modeling and OR-Software: Introduction.

**Annotation**

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

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

**Modellieren und OR-Software: Fortgeschrittene Themen**

2550490, WS 19/20, 3 SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**

After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation,...), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis.

Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

**Annotation**

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered in every winter term. The planned lectures and courses for the next three years are announced online.

**Workload**

The total workload for this course is approximately 135.0 hours. For further information see German version.
### 6.194 Course: Modeling, Measuring and Managing of Extreme Risks [T-WIWI-102841]

**Responsible:** Prof. Dr. Ute Werner  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101449 - Insurance Management II

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

T-WIWI-102841 Modelling, Measuring and Managing of Extreme Risks will be offered latest until summer term 2017 (beginners only).

**Prerequisites**  
None

**Recommendation**  
None
### 6.195 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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<th>3 SWS</th>
<th>Lecture (V)</th>
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### 6.196 Course: Multicore Computers and Computer Clusters [T-INFO-101325]

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<tr>
<td>Part of</td>
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<td>Recurrence</td>
<td>Each winter term</td>
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<td>Version</td>
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6.197 Course: Multivariate Statistical Methods [T-WIWI-103124]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of:  
- M/INFO-102233 - Further Examinations
- M/WIWI-101473 - Mathematical Programming
- M/WIWI-101637 - Analytics and Statistics
- M/WIWI-101639 - Econometrics and Statistics II
- M/WIWI-103289 - Stochastic Optimization

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).

The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Recommendation
The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course "Advanced Statistics". Without this, participation in the course is not advised.

Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.
### Course: Natural Language Processing and Software Engineering [T-INFO-101272]

- **Responsible:** Prof. Dr. Walter Tichy
- **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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<td>2 SWS</td>
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**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

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<td>24601</td>
<td>Netzsicherheit: Architekturen und Protokolle</td>
<td>2 SWS</td>
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</table>
6.200 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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<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Bless</td>
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</table>
6.201 Course: Non- and Semiparametrics [T-WIWI-103126]

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

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

**Part of:**  
- M-INFO-102233 - Further Examinations
- M-WIWI-101638 - Econometrics and Statistics I
- M-WIWI-101639 - Econometrics and Statistics II

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<td>2 SWS</td>
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**Competence Certificate**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Recommendation**
Knowledge of the contents covered by the course "Applied Econometrics" [2520020]

**Annotation**
The course takes place every second winter semester: 2018/19 then 2020/21
Course: Nonlinear Optimization I [T-WIWI-102724]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101473 - Mathematical Programming

<table>
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<td>4.5</td>
<td>Each winter term</td>
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<td>WS 19/20</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 and possibly of a compulsory prerequisite.

The exam takes place in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of Nonlinear Optimization II [2550113]. In this case, the duration of the written examination takes 120 minutes.

**Prerequisites**
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

**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, Open in study portal

**Learning Content**
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality conditions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Annotation**
Part I and II of the lecture are held consecutively in the same semester.
Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
6.203 Course: Nonlinear Optimization I and II [T-WIWI-103637]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101473 - Mathematical Programming

**Type**
- Written examination

**Credits**
- 9

**Recurrence**
- Each winter term

**Version**
- 5

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<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Stein</td>
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</table>

**Competence Certificate**
The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation 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, [Open in study portal]**

**Lecture (V)**

**Learning Content**
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality conditions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Annotation**
Part I and II of the lecture are held consecutively in the same semester.
Literature

Elective literature:
- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993

Nonlinear Optimization II
2550113, WS 19/20, 2 SWS, , Open in study portal

Lecture (V)

Learning Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Literature

Elective literature:
- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
6 COURSES

Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101473 - Mathematical Programming

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Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.
The exam can also be combined with the examination of Nonlinear Optimization I [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

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

Nonlinear Optimization II
2550113, WS 19/20, 2 SWS, Open in study portal

Learning Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993

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

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

**Part of:**
- M/INFO-102233 - Further Examinations
- M/WIWI-102805 - Service Operations

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**Competence Certificate**
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation). The examination is held in the term of the lecture and the following lecture.

**Prerequisites**
None

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

**Annotation**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101473 - Mathematical Programming
- M-WIWI-102805 - Service Operations
- M-WIWI-102832 - Operations Research in Supply Chain Management
- M-WIWI-103289 - Stochastic Optimization

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<td>Lecture (V)</td>
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<td>SS 2019</td>
<td>2550481</td>
<td>Übungen zu OR in Supply Chain Management</td>
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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 SCMIs assumed.

**Annotation**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

_Below you will find excerpts from events related to this course:_

**Operations Research in Supply Chain Management**

*2550480, SS 2019, 2 SWS, Language: Englisch, [Open in study portal](http://dol.ior.kit.edu/english/Courses.php)*

**Learning Content**
Supply Chain Management constitutes a general tool for logistics process planning in supply networks. To an increasing degree quantitative decision support is provided by methods and models from Operations Research. The lecture “OR in Supply Chain Management” conveys concepts and approaches for solving practical problems and presents an insight to current research topics. The lecture’s focus is set on modeling and solution methods for applications originating in different domains of a supply chain. The emphasis is put on mathematical methods like mixed integer programming, valid inequalities or column generation, and the derivation of optimal solution strategies.

In form and content, the lecture addresses all levels of Supply Chain Management: After a short introduction, the tactical and operational level will be discussed with regard to inventory models, scheduling as well as cutting and packing. The strategic level will be discussed in terms of layout planning. Another main focus of the lecture is the application of methods from online optimization. This optimization discipline has gained more and more importance in the optimization of supply chains over the several past years due to an increasing amount of dynamic data flows.

**Annotation**
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

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

- Dyckhoff, H.; Finke, U.: Cutting and Packing in Production and Distribution - A Typology and Bibliography, Physica-Verlag, 1992
6.207 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

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**Events**

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**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

The prerequisite for participation in the exam is the achievement of a minimum number of points in online tests. Details will be announced at the beginning of the course.

**Prerequisites**
None.
6.208 Course: Optimization under Uncertainty [T-WIWI-106545]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- 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.
### 6.209 Course: P&C Insurance Simulation Game [T-WIWI-102797]

**Responsible:** Prof. Dr. Ute Werner  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
**M-WIWI-101449 - Insurance Management II**

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**Competence Certificate**  
T-WIWI-102797 P+C Insurance Simulation Game will not be offered anymore from winter term 2016/2017 on.

**Prerequisites**  
None

**Recommendation**  
See German version.
**6.210 Course: Panel Data [T-WIWI-103127]**

**Responsible:** Dr. Wolf-Dieter Heller  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-101638 - Econometrics and Statistics I  
M-WIWI-101639 - Econometrics and Statistics II

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**Prerequisites**  
None
6.211 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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Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
### 6.212 Course: Parallel Computer Systems and Parallel Programming [T-INFO-101345]

**Responsible:** Prof. Dr. Achim Streit  
**Organisation:** KIT Department of Informatics  
**Part of:**  
- M-INFO-101210 - Dynamic IT-Infrastructures  
- M-INFO-102233 - Further Examinations

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6.213 Course: Parametric Optimization [T-WIWI-102855]

**Responsible:** Prof. Dr. Oliver Stein

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

**Part of:** M-INFO-102233 - Further Examinations
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.

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).
**6.214 Course: Patent Law [T-INFO-101310]**

- **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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6.215 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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Events

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

Pattern Recognition
24675, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

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
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
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- 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
6.216 Course: Personalization and Services [T-WIWI-102848]

**Responsible:** Dr.-Ing. Andreas Sonnenbichler

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-101470 - Data Science: Advanced CRM

### Type
- **Written examination**
- **Credits:** 4.5
- **Recurrence:** Each winter term
- **Version:** 1

### Events

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**Competence Certificate**

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

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

**Prerequisites**

None

**Recommendation**

None

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

**Personalization & Services**

2540533, WS 19/20, 2 SWS, Language: Deutsch, [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 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m

Literature
The course follows latest scientific papers. References to these papers are listed at the end of each course unit.
6.217 Course: Planning and Management of Industrial Plants [T-WIWI-102631]

**Responsibility:** Prof. Dr. Frank Schultmann

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

**Part of:** M-INFO-102233 - Further Examinations
M-WIWI-101471 - Industrial Production II

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<td>Übungen Anlagenwirtschaft</td>
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**Competence Certificate**
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. 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: Deutsch, [Open in study portal]

**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.
6.218 Course: Portfolio and Asset Liability Management [T-WIWI-103128]

**Responsibility:** Dr. Mher Safarian

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101639 - Econometrics and Statistics II

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

**Events**

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**Competence Certificate**

The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Prerequisites**

None

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

**Portfolio and Asset Liability Management**

2520357, SS 2019, 2 SWS, Language: Englisch, [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, 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

**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.
6.219 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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Course: Practical Course Protocol Engineering [T-INFO-104386]

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

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-101206 - Networking
- M-INFO-102233 - Further Examinations

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6.221 Course: Practical Course: Analysis of Complex Data Sets [T-INFO-105796]

**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-102807 - Practical Course: Analysis of Complex Data Sets

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Course: Practical Course: Database Systems [T-INFO-103201]

**6.222 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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6.223 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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<td>Practical course (P)</td>
<td>Xu, Prautzsch</td>
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</table>
### 6.224 Course: Practical Course: Implementation and Evaluation of Advanced Data Mining Approaches for Semi-Structured Data [T-INFO-106219]

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

**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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6.225 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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Events

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<td>24895</td>
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<td>Beigl, Riedel, Ravivanpong, Pescara</td>
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### 6.226 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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<th>Recurrence</th>
<th>Version</th>
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<td>Practical Course: Web Applications and Service-Oriented Architectures (II)</td>
<td>2 SWS</td>
<td>Practical course (P)</td>
<td>Abeck, Schneider</td>
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</table>
6.227 Course: Practical Seminar Digital Service Systems [T-WIWI-106563]

| Responsible: | Prof. Dr. Gerhard Satzger |
| Organisation: | KIT Department of Economics and Management |
| Part of: | M-INFO-102233 - Further Examinations  
M-WIWI-102808 - Digital Service Systems in Industry |

| Type | Examination of another type |
| Credits | 4.5 |
| Recurrence | Irregular |
| Version | 1 |

**Events**

| Events | Credits | Type | Recurrence | Version | Responsible |
| SS 2019 | 3 SWS | Practical Seminar: Information Systems & Service Design | | | Mädche |
| WS 19/20 | 3 SWS | Practical Seminar: Information Systems & Service Design | | | Mädche |

**Competence Certificate**
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
New course title starting summer term 2017: "Practical Seminar Digital Service Systems". The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.

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

**V Practical Seminar: Information Systems & Service Design**

| Description | Lecture (V) |
| SS 2019 | 2540554, 3 SWS, Open in study portal |

**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

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.
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
6.228 Course: Practical Seminar Knowledge Discovery [T-WIWI-102670]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-102827 - Service Computing

<table>
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<tr>
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<td>4</td>
<td>Each term</td>
<td>1</td>
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</table>

**Competence Certificate**
The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis, a presentation and a project. The final mark is based on the examination of the written seminar thesis and the project but can be upgraded or downgraded according to the quality of the presentation.

**Prerequisites**
None

**Recommendation**
Knowledge of algorithms in the area of knowledge discovery is assumed. Therefore it is recommended to attend the course [2511302] Knowledge Discovery beforehand.
6.229 Course: Practical Seminar Service Innovation [T-WIWI-102799]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101410 - Business & Service Engineering
- M-WIWI-102806 - Service Innovation, Design & Engineering

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</table>

**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-INFO-102233 - Further Examinations
- M-WIWI-103118 - Data Science: Data-Driven User Modeling

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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.
### 6.231 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-INFO-102233 - Further Examinations  
M-WIWI-103117 - Data Science: Data-Driven Information Systems

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<td>Each term</td>
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**Competence Certificate**  
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

**Prerequisites**  
None

**Recommendation**  
At least one module offered by the institute should have been chosen before attending this seminar.

**Annotation**  
The course is held in english. The course is not offered regularly.
6.232 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/INFO-102233 - Further Examinations  
M/WIWI-102805 - Service Operations

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**Events**

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<tr>
<td>SS 2019</td>
<td>2550498</td>
<td>Practical seminar: Health Care Management</td>
<td>5 SWS</td>
<td>Nickel, Reuter-Oppermann</td>
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</table>

**Competence Certificate**
The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

**Prerequisites**
None.

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

**Annotation**
The credits have been reduced to 4.5 starting summer term 2016.
The lecture is offered every term.
The planned lectures and courses for the next three years are announced online.

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

**Practical seminar: Health Care Management**

2550498, SS 2019, 5 SWS, Language: Deutsch, [Open in study portal]

**Learning Content**
Processes in a hospital are often grown historically ("We have always done it this way"), so that there has not been the need to analyze processes until reforms of the health system have put increasing pressure on hospitals. Consequently, nowadays hospitals look for possibilities to improve their processes. The students are confronted with case studies and are asked to develop a solution. Therefore they have to collect and analyze relevant data, processes and structures. When developing the solution the students have to bear in mind that besides the economic efficiency also the quality of care and patient satisfaction (e.g. measured in waiting time) may not be neglected in the health care sector.

**Annotation**
The lecture is offered every term.
The planned lectures and courses for the next three years are announced online.

**Workload**
The total workload for this course is approximately 135 hours. For further information see German version.

**Literature**

**Elective literature:**
- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
**6.233 Course: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]**

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-102806 - Service Innovation, Design & Engineering
- M-WIWI-104068 - Information Systems in Organizations
- M-WIWI-104080 - Designing Interactive Information Systems

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<td>2540554</td>
<td>Practical Seminar: Information Systems &amp; Service Design</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 (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

**Prerequisites**

None.

**Recommendation**

Attending the course „Digital Service Design“ is recommended, but not mandatory.

**Annotation**

The course is held in English.

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

**Practical Seminar: Information Systems & Service Design**

2540554, SS 2019, 3 SWS, [Open in study portal]

**Description**

Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016).

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of Future Corporate Management. The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

**Learning Content**

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes
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-INFO-102233 - Further Examinations
- M-WIWI-101453 - Applied Strategic Decisions
- M-WIWI-101505 - Experimental Economics

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<td>2520403</td>
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**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

**Annotation**
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.
### 6.235 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-INFO-102233 - Further Examinations  
- M-WIWI-101409 - Electronic Markets

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<td>Each summer term</td>
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**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.
6.236 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-INFO-102233 - Further Examinations  
M-WIWI-101487 - Sales Management

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<td>2572198</td>
<td>Price Negotiation and Sales</td>
<td>1 SWS</td>
<td>Block (B)</td>
<td>Klarmann, Schröder</td>
<td>3</td>
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</table>

**Competence Certificate**


**Prerequisites**

None

**Recommendation**

None

**Annotation**

Participation requires an application. The application period starts at the beginning of the semester. More information can be obtained on the website of the research group Marketing & Sales (marketing.iism.kit.edu).

Access to this course is restricted. Typically all students will be granted the attendance of one course with 1.5 ECTS. Nevertheless attendance cannot 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:*

**Price Negotiation and Sales Presentations**

2572198, WS 19/20, 1 SWS, Language: Deutsch, [Open in study portal]

**Learning Content**

At first, theoretical knowledge about the behavior in selling contexts is discussed. Then, in a practical part, students will apply this knowledge in their own price negotiations.

**Annotation**

- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the following courses can be chosen in the Sales Management Module: Country Manager Simulation, Case Studies in Sales and Pricing or Preisverhandlungen und Verkaufspräsentationen.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

**Workload**

The total workload for this course is approximately 45.0 hours. For further information see German version.

**Literature**

None
6.237 Course: Pricing [T-WIWI-102883]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
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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Events

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<td>2572157</td>
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<td>WS 19/20</td>
<td>2572169</td>
<td>Übung zu Pricing</td>
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<td>Practice (Ü)</td>
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Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

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

Pricing
2572157, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

Learning Content
This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

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

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.
### 6.238 Course: Principles of Insurance Management [T-WIWI-102603]

<table>
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<tr>
<th>Responsible:</th>
<th>Prof. Dr. Ute Werner</th>
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<td>KIT Department of Economics and Management</td>
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| Part of:         | M-INFO-102233 - Further Examinations  
M-WIWI-101449 - Insurance Management II |

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<td>Each summer term</td>
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</table>

**Competence Certificate**

The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).

The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

The examination will be offered latest until summer term 2017 (beginners only).

**Prerequisites**

None

**Recommendation**

None
6.239 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

<table>
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<td>Each summer term</td>
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<td>and Innovation Management</td>
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<tr>
<td>2 SWS Lecture (V) Klarmann</td>
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</table>

**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

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

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

**Product and Innovation Management**
2571154, SS 2019, 2 SWS, Language: Englisch, [Open in study portal]

**Learning Content**
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

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

**Workload**
Total effort for 3 credit points: approx. 90 hours
Presence time: 30 hours
Preparation and wrap-up of LV: 45.0 hours
Exam and exam preparation: 15.0 hours

**Literature**
6.240 Course: Production and Logistics Management [T-WIWI-102632]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101412 - Industrial Production III

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**Events**

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<th>Lecture (V)</th>
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<tr>
<td>SS 2019</td>
<td>2581955</td>
<td>Übung zu Produktions- und Logistikmanagement</td>
<td>2 SWS</td>
<td>Practice (Ü)</td>
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**Competence Certificate**
The assessment consists of a written exam (90 minutes) (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

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

**Production and Logistics Management**
2581954, SS 2019, 2 SWS, Language: Deutsch, [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.

**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
6.241 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

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<tbody>
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<td>2512501</td>
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**Projektpraktikum Kognitive Automobile und Roboter**

<table>
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<tr>
<th>3 SWS</th>
<th>Practical course (P)</th>
<th>Zöllner</th>
</tr>
</thead>
</table>

**Competence Certificate**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

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

Details of the grade formation will be announced at the beginning of the course.

**Prerequisites**
None
### 6.242 Course: Project Lab Machine Learning [T-WIWI-109983]

**Responsible:** Prof. Dr.-Ing. Johann Marius Zöllner  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103356 - Machine Learning

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<th>3 SWS</th>
<th>Practical course (P)</th>
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</table>

**Competence Certificate**
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- 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
6.243 Course: Project Management [T-WIWI-103134]

**Responsible:** Prof. Dr. Frank Schultmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M/INFO-102233 - Further Examinations  
M/WIWI-101412 - Industrial Production III  
M/WIWI-101471 - Industrial Production II

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<td>Practice (Ü)</td>
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<td>Volk, Wiens, Schumacher, Rosenberg, Wehrle</td>
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<td>2581964</td>
<td>Übung zu Mgmt</td>
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</table>

**Competence Certificate**  
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

**Prerequisites**  
None

**Recommendation**  
None

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

**Project Management**  
2581963, WS 19/20, 2 SWS, Language: Englisch, [Open in study portal](#)

**Learning Content**
1. Introduction  
2. Principles of Project Management  
3. Project Scope Management  
4. Time Management and Resource Scheduling  
5. Cost Management  
6. Quality Management  
7. Risk Management  
8. Stakeholder  
9. Communication, Negotiation and Leadership  
10. Project Controlling

**Workload**  
The total workload for this course is approximately 105 hours. For further information see German version.

**Literature**  
will be announced in the course
6.244 Course: Project Management in Practice [T-INFO-101976]

- **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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<th>2400019</th>
<th>Project Management in Practice</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Böhm, Schnober</th>
</tr>
</thead>
</table>

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

### 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
T 6.245 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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<th>Recurrence</th>
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<th>Events</th>
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<tbody>
<tr>
<td>SS 2019</td>
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</table>

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

Provable Security in Cryptography
24166, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

Lecture (V)

Learning Content
When is an encryption scheme secure? What type of security is guaranteed by a digital signature scheme? How can secure cryptographic systems be constructed? These and more questions are the topic of this lecture. We put particular emphasis on concrete examples: we will present several cryptographic schemes (such as encryption schemes) and analyze their security properties. In this, the notion of a security proof will play a central role. We endeavour to find mathematical proofs that a given system achieves certain desirable properties under well-defined complexity-theoretic assumptions.
6.246 Course: Public Management [T-WIWI-102740]

Responsibility: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management

Part of:
- M-INFO-102233 - Further Examinations
- M-WIWI-101504 - Collective Decision Making
- M-WIWI-101511 - Advanced Topics in Public Finance

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

Events
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<td>2561127</td>
<td>Public Management</td>
<td>3 SWS</td>
<td>Lecture / Practice (VÜ)</td>
<td>Wigger</td>
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</table>

Competence Certificate
The assessment consists of 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: Deutsch, Open in study portal

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-incremency, 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:
### 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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</table>
Below you will find excerpts from events related to this course:

**Public Revenues**
2560120, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal]

Lecture (V)

**Description**
The Public Revenues lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public dept-incurring.

**Learning Content**
The Public Revenues lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public dept-incurring.

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

**Literature**

**Elective literature:**
6.249 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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**Events**

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<td>Python for Computational Risk and Asset Management</td>
<td>Practical course (P)</td>
<td>2 SWS</td>
<td>Ulrich</td>
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</table>

**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:*

<table>
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<tr>
<th>Python for Computational Risk and Asset Management</th>
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<tbody>
<tr>
<td>2500016, WS 19/20, 2 SWS, Language: Englisch, Open in study portal</td>
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</table>

**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.

**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.
Course: Quantitative Methods in Energy Economics [T-WIWI-107446]

**Responsible:** Dr. Dogan Keles
Patrick Plötz

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

**Part of:** M-INFO-102233 - Further Examinations

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<th>Recurrence</th>
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<td>2 SWS</td>
<td>Lecture (V)</td>
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<td>WS 19/20 2581008</td>
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<td>Practice (Ü)</td>
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**Competence Certificate**
The assessment consists of a written exam (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
None

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

**Quantitative Methods in Energy Economics**
2581007, WS 19/20, 2 SWS, Language: Englisch, [Open in study portal](#)

**Learning Content**
Energy economics makes use of many quantitative methods in exploration and analysis of data as well as in simulations and modelling. This lecture course aims at introducing students of energy economics into the application of quantitative methods and techniques as taught in elementary courses to real problems in energy economics. The focus is mainly on regression, simulation, time series analysis and related statistical methods as applied in energy economics.

**Workload**
The total workload for this course is approximately 120 hours. For further information see German version.
### 6.251 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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<tr>
<td>WS 19/20</td>
<td>24171</td>
<td>Randomized Algorithms</td>
<td>3 SWS</td>
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Information Engineering and Management M.Sc.  
Module Handbook as of 22.08.2019
6 COURSES

6.252 Course: Recommender Systems [T-WIWI-102847]

Responsible: Prof. Dr. Andreas Geyer-Schulz
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101410 - Business & Service Engineering
M-WIWI-101470 - Data Science: Advanced CRM

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<td>Recommender Systems</td>
<td>Each summer term</td>
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<tr>
<td>SS 2019 2540507</td>
<td>1 SWS</td>
<td>Exercise Recommender Systems</td>
<td>Each summer term</td>
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</table>

Competence Certificate

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

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

Prerequisites
None

Recommendation
None

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

Recommender Systems
2540506, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

Learning Content

At first, an overview of general aspects and concepts of recommender systems and its relevance for service providers and customers is given. Next, different categories of recommender systems are discussed. This includes explicit recommendations like customer reviews as well as implicit services based on behavioral data. Furthermore, the course gives a detailed view of the current research on recommender systems at the Chair of Information Services and Electronic Markets.

Workload

The total workload for this course is approximately 135 hours (4.5 credits):

Time of attendance
- Attending the lecture: 15 x 90min = 22h 30m
- Attending the exercise classes: 7 x 90min = 10h 30m
- Examination: 1h 00m

Self-study
- Preparation and wrap-up of the lecture: 15 x 180min = 45h 00m
- Preparing the exercises: 25h 00m
- Preparation of the examination: 31h 00m

Sum: 135h 00m
Literature


Elective literature:


6.253 Course: Regulation Theory and Practice [T-WIWI-102712]

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

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

**Part of:**
- M/INFO-102233 - Further Examinations
- M/WIWI-101406 - Network Economics

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<tr>
<td>Oral examination</td>
<td>4.5</td>
<td>see Annotations</td>
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</table>

**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.
6.254 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

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**Events**

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<th>Requirements Engineering</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Koziolek</th>
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</table>

**Recommendation**

Das Modul Softwaretechnik II wird empfohlen.

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

**Requirements Engineering**

**2400050, SS 2019, 2 SWS, Language: Englisch**, [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 Ilias 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:

- M.A. Jackson (1995). Software Requirements and Specifications: A Lexicon of Practice, Principles and Prejudices. Addison-Wesley (ACM Press books); Wokingham, etc.
6.255 Course: Risk Communication [T-WIWI-102649]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101449 - Insurance Management II

**Type**
- Oral examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 1

**Competence Certificate**
The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (30 min.) according to Section 4 (2), 2 of the examination regulation.

The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

**Prerequisites**
None

**Recommendation**
None
6.256 Course: Risk Management in Industrial Supply Networks [T-WIWI-102826]

**Responsible:** Dr. Marcus Wiens

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

**Part of:**
- M/INFO-102233 - Further Examinations
- M-WIWI-101412 - Industrial Production III
- M-WIWI-101471 - Industrial Production II

**Type**
- Written examination

**Credits**
- 3.5

**Recurrence**
- Each winter term

**Version**
- 1

**Events**

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<th>Course Title</th>
<th>SWS</th>
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<tr>
<td>WS 19/20</td>
<td>2581992</td>
<td>Risk Management in Industrial Supply Networks</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Wiens</td>
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<tr>
<td>WS 19/20</td>
<td>2581993</td>
<td>Übung zu Risk Management in Industrial Supply Networks</td>
<td>1</td>
<td>Practice (Ü)</td>
<td>Klein, Wiens</td>
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</table>

**Competence Certificate**

The assessment consists of an oral (30 minutes) or a written (60 minutes) exam (following § 4(2), 1 of the examination regulation). The exam takes place in every semester. 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**

<table>
<thead>
<tr>
<th>Lecture Code</th>
<th>WS 19/20</th>
<th>SWS</th>
<th>Language</th>
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<tr>
<td>2581992</td>
<td>2</td>
<td>2</td>
<td>Englisch</td>
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</tbody>
</table>

**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
**6.257 Course: Roadmapping [T-WIWI-102853]**

**Responsible:** Dr. Daniel Jeffrey Koch  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101488 - Entrepreneurship (EnTechnon)  
- M-WIWI-101507 - Innovation Management  
- M-WIWI-101507 - Innovation Management

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<td>Examination of another type</td>
<td>3</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

| Events | SS 2019 | 2545102 | Roadmapping | 2 SWS | Seminar (S) | Koch |

**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:*

**Roadmapping**  
2545102, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**  
Roadmapping is a method used to support innovation decisions in the early phase of innovation management. The roadmapping process addresses the procedure of constructing roadmaps which can then be assessed. Roadmapping provides structured and graphical visualizations of preferably future-oriented topics which have innovation potentials. The benefits of the roadmapping method lie in the structured bundling of both technology- and market-driven individual topics and the joint setting of priorities and processes to achieve predetermined corporate targets. As a rule, roadmaps represent a consensus reached by the people involved in their compilation. For this reason, roadmaps are suited to the designation and initial prioritization of emerging technologies and corresponding development projects.

**Workload**  
The total workload for this course is approximately 90 hours. For further information see German version.
T 6.258 Course: Robotics I - Introduction to Robotics [T-INFO-108014]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-100893 - Robotics I - Introduction to Robotics

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**Events**

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<tr>
<td>WS 19/20</td>
<td>2424152</td>
<td>Robotics I - Introduction to Robotics</td>
<td>3/1</td>
<td>Lecture (V)</td>
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</table>
### Course: Robotics II: Humanoid Robotics [T-INFO-105723]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101251 - Autonomous Robotics

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**Events**

| SS 2019 | 2400074 | Robotics II: Humanoid Robotics | 2 SWS | Lecture (V) | Asfour, Wächter |

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

#### Robotics II: Humanoid Robotics

2400074, SS 2019, 2 SWS, Language: Deutsch/Englisch, Open in study portal  
Lecture (V)

**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

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-INFO-101251 - Autonomous Robotics

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<td>Written exam</td>
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<td>Each summer term</td>
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Events

| Events | SS 2019 | 2400067 | Robotics III - Sensors and Perception in Robotics | 2 SWS | Lecture (V) | Asfour, Grotz |

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

**Robotics III - Sensors and Perception in Robotics**
2400067, SS 2019, 2 SWS, Language: Deutsch/Englisch, Open in study portal

**Lecture (V)**

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
**Course: Sales Management and Retailing [T-WIWI-102890]**

**Responsible:** Prof. Dr. Martin Klarmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-101487 - Sales Management

<table>
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**Events**

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<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Klarmann</td>
</tr>
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</table>

**Competence Certificate**  
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**  
None

**Recommendation**  
None

**Annotation**  
The lecture is compulsory for the module Sales Management. It is taught in English.  
For further information please contact Marketing and Sales Research Group (marketing.iism.kit.edu).

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

**Sales Management and Retailing**  
2572156, WS 19/20, 2 SWS, Language: Englisch, [Open in study portal]

**Learning Content**  
The aim of the course "Sales Management and Retailing" is on the one hand to give insights into the challenging realization of a successful sales management and on the other hand to discuss peculiarities of retailing contexts. The contents are below others:

- Customer relationship management (word-of-mouth-analysis, key account management, loyalty programs, complain management etc.)  
- Retail marketing (trends, point of sale design etc.)  
- Retailer-producer relationships

**Annotation**  
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).  
This course is held in English.

**Workload**  
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**  
6.262 Course: Secure Multiparty Computation [T-INFO-108540]

**Responsible:** Prof. Dr. Jörn Müller-Quade

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-104119 - Secure Multiparty Computation

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<tr>
<td>Oral exam</td>
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<td>Each term</td>
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</table>
# 6.263 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-102233 - Further Examinations

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**Events**

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<tr>
<td>SS 2019</td>
<td>24941</td>
<td>3 SWS</td>
<td>Lecture (V)</td>
<td>Müller-Quade</td>
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</table>
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-INFO-102233 - Further Examinations
- M-WIWI-104403 - Critical Digital Infrastructures

**Type:** Examination of another type

**Credits:** 4,5

**Recurrence:** Each summer term

**Version:** 2

**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".
6.265 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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<td>SS 2019</td>
<td>Selected legal issues of Internet law</td>
<td>2 SWS</td>
<td>Colloquium (KOL)</td>
<td>Dreier</td>
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</table>
6.266 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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<tbody>
<tr>
<td>Oral examination</td>
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**Events**

| SS 2019 | 24623 | Selected topics in Cryptography | 2 SWS | Lecture (V) | Müller-Quade, Kloß, Mechler |

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

**Selected topics in Cryptography**

24623, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Lecture (V)**

**Learning Content**

- 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
6.267 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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Module Handbook as of 22.08.2019
Course: Semantic Web Technologies [T-WIWI-102874]

6.268 Course: Semantic Web Technologies [T-WIWI-102874]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101455 - Web Data Management
- M-WIWI-101457 - Semantic Technologies
- M-WIWI-102827 - Service Computing

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<td>Written examination</td>
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<td>Each summer term</td>
<td>2</td>
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</tbody>
</table>

**Events**

| SS 2019 | 2511310 | Semantic Web Technologies | 2 SWS | Lecture (V) | Sure-Vetter, Acosta Deibe, Käfer |
| SS 2019 | 2511311 | Exercises to Semantic Web Technologies | 1 SWS | Practice (Ü) | Sure-Vetter, Acosta Deibe, Käfer |

**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 2019, 2 SWS, Language: Englisch, Open in study portal

**Description**

The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals.

Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

**Learning Content**

The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

**Workload**

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours
Literature


Additional Literature


Exercises to Semantic Web Technologies

2511311, SS 2019, 1 SWS, Language: Englisch, Open in study portal

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

Learning Content
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Workload
The total workload for the lecture Semantic Web Technologies is given out on the description of the lecture.

Literature


Additional Literature

## 6.269 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-INFO-102233 - Further Examinations  
M-WIWI-102736 - Seminar Module Economic Sciences

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<td>Seminar (S)</td>
<td>Beigl, Mädche, Pescara, Toreini</td>
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<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Nieken, Mitarbeiter</td>
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<tr>
<td>SS 2019 2500007</td>
<td>Seminar Human Resources and Organizations (Master)</td>
<td>2 SWS</td>
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<td>SS 2019 2530372</td>
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<td>Seminar (S)</td>
<td>Ulrich</td>
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<td>SS 2019 2530374</td>
<td>Applied Risk and Asset Management</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Ulrich</td>
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<tr>
<td>SS 2019 2530580</td>
<td>Seminar in Finance (Master, Prof. Uhrig-Homburg)</td>
<td>2 SWS</td>
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<td>Uhrig-Homburg, Hofmann, Reichenbacher, Eska</td>
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<td>SS 2019 2540559</td>
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<td>SS 2019 2550493</td>
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<td>SS 2019 2581977</td>
<td>Seminar Produktionswirtschaft und Logistik II</td>
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<td>WS 19/20 2500006</td>
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<td>WS 19/20 2530293</td>
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<td>WS 19/20 2540510</td>
<td>Literature Review Seminar: Information Systems and Service Design</td>
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<td>WS 19/20 2572181</td>
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<td>WS 19/20 2573010</td>
<td>Seminar: Human Resource Management (Bachelor)</td>
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<td>Seminar (S)</td>
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### Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

### Prerequisites
None.

### Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

### Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

#### Seminar Human Resource Management (Master)
2500006, SS 2019, 2 SWS, [Open in study portal](#)

Notes
See Module Handbook

#### Seminar Human Resources and Organizations (Master)
2500007, SS 2019, 2 SWS, [Open in study portal](#)

Notes
See Module Handbook

#### Automated Financial Advisory
2530372, SS 2019, 2 SWS, Language: Englisch, [Open in study portal](#)

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Workload
The total workload for this course is approximately 90 hours.
Literature
Literature will be distributed during the first lecture.

Seminar in Finance (Master, Prof. Uhrig-Homburg)
2530580, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

Learning Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

Masterseminar Big Data Mining in Finance
2540510, SS 2019, 2 SWS, Language: Deutsch/Englisch, Open in study portal

Literature:

Hospital Management
2550493, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

Description
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals and relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Learning Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals and relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Annotation
It is planned to offer the course every semester.

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

Seminar Management Accounting
2579904, SS 2019, 2 SWS, Language: Englisch, Open in study portal

Notes
see Module Handbook
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
see Module Handbook

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Special Topics in Management Accounting
2579905, SS 2019, 2 SWS, Language: Englisch, Open in study portal

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Seminar Human Resource Management (Master)
2500006, WS 19/20, 2 SWS, Open in study portal

Notes
See Module Handbook

Seminar Human Resources and Organizations (Master)
2500007, WS 19/20, 2 SWS, Open in study portal

Notes
See Module Handbook
Seminar in Data Science for Finance
2500029, WS 19/20, 2 SWS, Language: Englisch, 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.

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.

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.

Masterseminar in Data Science and Machine Learning
2540510, WS 19/20, 2 SWS, Language: Deutsch, 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

Digital Service Design Seminar
2540559, WS 19/20, 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

Marketing Seminar
2572181, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

Learning Content
The seminar teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Annotation
Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)

Workload
The total workload for this course is approximately 90 hours. For further information see German version.
Literature
will be announced in the seminar.

Seminar: Human Resources and Organizations (Bachelor)
2573010, WS 19/20, 2 SWS, Open in study portal

Notes
See Module Handbook

Seminar: Human Resource Management (Bachelor)
2573011, WS 19/20, 2 SWS, Open in study portal

Notes
See Module Handbook
### 6.270 Course: Seminar in Economic Policy [T-WIWI-102789]

**Responsible:** Prof. Dr. Ingrid Ott  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101514 - Innovation Economics

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<tr>
<td>Examination of another type</td>
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<td>Each term</td>
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</table>

#### Competence Certificate
The assessment is carried out through a term paper within the range of 12 to 15 pages, a presentation of the results of the work in a seminar meeting, and active participation in the discussions of the seminar meeting (§ 4 (2), 3 SPO).

The final grade is composed of the weighted graded examinations. (Essay 50%, 40% oral presentation, active participation 10%).

#### Prerequisites
None

#### Recommendation
At least one of the lectures “Theory of Endogenous Growth” or “Innovation Theory and Policy” should be attended in advance, if possible.
6.271 Course: Seminar in Economics A (Master) [T-WIWI-103478]

**Responsibility:** Professorenchaft des Fachbereichs Volkswirtschaftslehre

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-102736 - Seminar Module Economic Sciences

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<td>SS 2019 2560282</td>
<td>Wirtschaftspolitisches Seminar</td>
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<td>SS 2019 2560552</td>
<td>Topics in Political Economics (Master)</td>
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<tr>
<td>SS 2019 2560554</td>
<td>Morals and Social Behavior (Master)</td>
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<td>WS 19/20 2560140</td>
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<tr>
<td>WS 19/20 2560142</td>
<td>Topics on Political Economics (Master)</td>
<td>2 SWS</td>
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<tr>
<td>WS 19/20 2561208</td>
<td>Ausgewählte Aspekte der europäischen Verkehrsplanung und -modellierung</td>
<td>1 SWS</td>
<td>Seminar (S)</td>
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**Competence Certificate**
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**
None.

**Recommendation**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**
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 2019, 2 SWS, Language: Englisch, Open in study portal

**Annotation**
The course will be offered in English.
Topics in Political Economics (Master)
2560552, SS 2019, 2 SWS, Language: Englisch, Open in study portal

Description
In many companies relative reward schemes are used whereby employees earn a bonus if they perform better than their colleagues. Moreover, hierarchical structures mean that in many organizations, employees find themselves in constant competition for promotions. This is meant to provide incentives for higher performance. However, competitive remuneration schemes could also have detrimental effects such that individual workers may view their colleagues as direct competitors generating more selfish and/or less helpful behavior in the workplace. Furthermore, age, gender and culture seem to have impacts on willingness to compete. For example, in western cultures, adult men sometimes enter competition even though their performance level is way too low for success, i.e., they harm themselves by over-competitiveness. In contrast, adult females sometimes compete less than they could do successfully.

Another challenge in contest design, e.g. in sports, is that when competition takes place among workers with mixed abilities it may lead to a discouragement effect, which establishes that lower ability individuals often reduce effort competing against an individual they do not feel up to (e.g. it has been found that average golf players performed significantly worse when competing against a superstar like Tiger Woods). One solution suggested by the economic literature is to level the playing field between advantaged and disadvantaged individuals by favoring weaker individuals through bid-caps, asymmetric tie-breaking rules, or advances. In sports, asymmetric tie-breaking is already common, for instance, in the Champions League soccer playoffs “away goals” become the decisive factor in determining the winning team in case of a tie.

Contests are not only a well-established mechanism for incentivizing workers but also for encouraging innovation and advancing R&D. Elements of research and innovation contests can be found in the procurement of various goods and services. For instance, the construction of new buildings, proposals in a venture capital firm or TV shows for entertainment companies all flow through a similar innovation process that involves the solicitation of bids from multiple potential suppliers and the preparation of a pilot or a proposal. In other cases, e.g., in lobbying contests, it is often discussed whether investments are beneficial or not. Some authors have argued that investments into lobbying should be capped in order to soften competition among asymmetrically strong interest groups (e.g. the lobbying industry versus consumers’ interest groups). Of course, then the question arises whether such caps achieve the respective design goal or not.

In this seminar, we discuss questions like: How can we design workplaces and labor contracts to increase motivation and productivity? How can contests be used to foster innovation? Which role should social preferences play and how could they inspire specific contest designs? How should sport contests be engineered depending on the respective goals? How should we design lobbying contests?

Also related topics are very welcome!

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact Patrick Maus (Patrick.Maus@kit.edu).

Workload
About 90 hours

Literature

Morals and Social Behavior (Master)
2560554, SS 2019, 2 SWS, Language: Englisch, Open in study portal

Description
For a long time, economists studied given markets and mechanisms to predict outcomes, future developments or generally the participants’ behavior. In contrast, Market Design uses theory, empirical and experimental work to design markets which incentivize their participants in a way that leads to a “desirable” outcome. In this, the designer can have different objectives, for example: Maximizing efficiency, welfare or minimizing negative externalities.

Prominent applications of Market Design include, quite topical, Germany’s auction of 5G mobile licenses and matching markets, where there are two large populations that need to be matched to one another (think of hospitals and interns, students and dorm rooms or kidney donors and receivers). In this seminar, we think about ways to either design new markets or how we could alter existing ones in a socially beneficial way. Alternatively, research ideas could focus on finding failures or shortcomings of ineffectively designed markets.
Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.

Topics on Political Economics (Bachelor)
2560140, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Workload
About 90 hours.

Topics on Political Economics (Master)
2560142, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Workload
About 90 hours.
6.272 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-102233 - Further Examinations
- M-INFO-102822 - Seminar Module Informatics
- M-WIWI-101457 - Semantic Technologies

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<td>SS 2019 2512300</td>
<td>Knowledge Discovery and Data Mining</td>
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<tr>
<td>SS 2019 2513306</td>
<td>Data Science &amp; Real-time Big Data Analytics</td>
<td>2 SWS</td>
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<tr>
<td>SS 2019 2513400</td>
<td>Emerging Trends in Critical Information Infrastructures</td>
<td>2 SWS Seminar ($)</td>
<td>Lins, Sunyaev, Thiebes</td>
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<tr>
<td>SS 2019 2595470</td>
<td>Seminar Service Science, Management &amp; Engineering</td>
<td>2 SWS Seminar ($)</td>
<td>Weinhardt, Nickel, Fichtner, Satzger, Sure-Vetter, Fromm</td>
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<tr>
<td>WS 19/20 2400125</td>
<td>Security and Privacy Awareness</td>
<td>2 SWS Seminar ($)</td>
<td>Boehm, Seidel-Saul, Volkamer, Aldag, Gerber, Gottschalk</td>
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<tr>
<td>WS 19/20 2512301</td>
<td>Linked Data and the Semantic Web</td>
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<td>WS 19/20 2512311</td>
<td>Real-World Challenges in Data Science and Analytics</td>
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<tr>
<td>WS 19/20 2513500</td>
<td>Cognitive Automobiles and Robots</td>
<td>2 SWS Seminar ($)</td>
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<td>WS 19/20 2595470</td>
<td>Seminar Service Science, Management &amp; Engineering</td>
<td>3 SWS Seminar ($)</td>
<td>Weinhardt, Satzger, Nickel, Fromm, Fichtner, Sure-Vetter</td>
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</table>

**Competence Certificate**
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**
None.

**Recommendation**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**
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:

### Knowledge Discovery and Data Mining

**Course:** Knowledge Discovery and Data Mining  
**Code:** 2512300, **SS 2019**, 3 SWS, Language: Englisch, [Open in study portal](#)

**Description**  
The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

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

**Learning Content**  
Domains of interest include, but are not limited to:
- Medicine
- Social Media
- Finance Market

**Literature**  
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:
- Mitchell, T.: Machine Learning  

### Data Science & Real-time Big Data Analytics

**Course:** Data Science & Real-time Big Data Analytics  
**Code:** 2513306, **SS 2019**, 2 SWS, Language: Deutsch/Englisch, [Open in study portal](#)

**Description**  
Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term “Big Data”. The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

### Seminar Service Science, Management & Engineering

**Course:** Seminar Service Science, Management & Engineering  
**Code:** 2595470, **SS 2019**, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**  
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.  
See the KSRI website for more information about this seminar: [www.ksri.kit.edu](http://www.ksri.kit.edu)

**Workload**  
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**  
The student will receive the necessary literature for his research topic.

### Linked Data and the Semantic Web

**Course:** Linked Data and the Semantic Web  
**Code:** 2512301, **WS 19/20**, 3 SWS, Language: Deutsch/Englisch, [Open in study portal](#)
Description
The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

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

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

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

Learning Content
Topics of interest include, but are not limited to:

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

Real-World Challenges in Data Science and Analytics
2512311, WS 19/20, 3 SWS, Language: Deutsch/Englisch, [Open in study portal]

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

Seminar Service Science, Management & Engineering
2595470, WS 19/20, 3 SWS, Language: Deutsch, [Open in study portal]

Learning Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: [www.ksri.kit.edu](http://www.ksri.kit.edu)

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.
6.273 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-INFO-102233 - Further Examinations
M-WIWI-102736 - Seminar Module Economic Sciences

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<thead>
<tr>
<th>Events</th>
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<th>Recurrence</th>
<th>Version</th>
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<tbody>
<tr>
<td>SS 2019 2550132 Seminar zur Mathematischen Optimierung (MA)</td>
<td>Examination of another type</td>
<td>3</td>
<td>Each term</td>
<td>1</td>
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<tr>
<td>SS 2019 2550473 Seminar on Power Systems Optimization (Master)</td>
<td></td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Rebennack, Assistenten</td>
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<tr>
<td>SS 2019 2550491 Seminar zur diskreten Optimierung</td>
<td></td>
<td>SWS</td>
<td>Block (B)</td>
<td>Nickel, Mitarbeiter</td>
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<tr>
<td>WS 19/20 2550473 Seminar on Power Systems Optimization (Master)</td>
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<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Rebennack, Sinske</td>
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<tr>
<td>WS 19/20 2550491 Seminar: Modern OR and Innovative Logistics</td>
<td></td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Nickel, Mitarbeiter</td>
</tr>
</tbody>
</table>

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

Seminar zur diskreten Optimierung
2550491, SS 2019, SWS, Language: Deutsch, Open in study portal

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

Annotation
The seminar is offered 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, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminary meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.
6.274 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-INFO-102233 - Further Examinations
- M-WIWI-102736 - Seminar Module Economic Sciences

**Events**

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<tr>
<th>SS 2019</th>
<th>2521310</th>
<th>Advanced Topics in Econometrics</th>
<th>2 SWS</th>
<th>Seminar (S)</th>
<th>Schienle, Chen, Görgen</th>
</tr>
</thead>
</table>

**Competence Certificate**
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**
None.

**Recommendation**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

### Advanced Topics in Econometrics

2521310, SS 2019, 2 SWS, Language: Englisch, Open in study portal

**Annotation**
The course will be offered in English.
6.275 Course: Seminar Informatics A [T-INFO-104336]

**Responsible:** Prof. Dr. Sebastian Abeck  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-102233 - Further Examinations  
M-INFO-102822 - Seminar Module Informatics

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**Events**

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<tr>
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<td>2400011</td>
<td>Hot Topics in Bioinformatics</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Stamatakis</td>
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<tr>
<td>SS 2019</td>
<td>24344</td>
<td>Advanced Methods of Information Fusion</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Hanebeck, Radtke</td>
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<tr>
<td>WS 19/20</td>
<td>24844</td>
<td>Seminar: Ubiquitous Systems</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Beigl, Pescara</td>
</tr>
</tbody>
</table>

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

**Advanced Methods of Information Fusion**  
24344, SS 2019, 2 SWS, Language: Deutsch/Englisch, [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.
6.276 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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| SS 2019 | 2400041 | Governance, Risk & Compliance | 2 SWS | Seminar (S) | Herzig |
# 6.277 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  

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<tr>
<td>SS 2019 2400041</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Governance, Risk &amp; Compliance</td>
<td>Herzig</td>
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<td>SS 2019 2400061</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung</td>
<td>Bless, Boehm, Hartenstein, Mädche, Sunyaev, Zitterbart</td>
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<tr>
<td>SS 2019 24820</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Current Issues in Patent Law</td>
<td>Melullis</td>
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<tr>
<td>WS 19/20 24389</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>IT-Sicherheit und Recht</td>
<td>Schallbruch</td>
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</table>

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

**Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung**  
2400061, SS 2019, 2 SWS, Open in study portal  

**Notes**  
Registration via [https://portal.wiwi.kit.edu/ys/2708](https://portal.wiwi.kit.edu/ys/2708)
# 6.278 Course: Service Analytics A [T-WIWI-105778]

**Responsible:** Prof. Dr. Hansjörg Fromm  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- 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

### Events

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<tr>
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<th>Credits</th>
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<tr>
<td>SS 2019</td>
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<td>Service Analytics A</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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<td>SS 2019</td>
<td>2595502</td>
<td>Übung zu Service Analytics A</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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</table>

### Competence Certificate

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

### Prerequisites

None

### Recommendation

The lecture is addressed to students with interests and basic knowledge in the topics of Operations Research, descriptive and inductive statistics.

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

**Service Analytics A**  
2595501, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

### Learning Content

Today's service-oriented companies are starting to optimize the way services are planned, operated, and personalized by analyzing vast amounts of data from customers, IT-systems, or sensors. As the statistical learning and business optimization world continues to progress, skills and expertise in advanced data analytics and data and fact-based optimization become vital for companies to be competitive. In this lecture, relevant methods and tools will be considered as a package, with a strong focus on their inter-relations. Students will learn to analyze and structure large amounts of potentially incomplete and unreliable data, to apply multivariate statistics to filter data and to extract key features, to predict future behavior and system dynamics, and finally to formulate data and fact-based service planning and decision models.

More specifically, the lessons of this lecture will include:

- Co-Creation of Value Across Enterprises
- Instrumentation, Measurement, Monitoring of Service Systems
- Descriptive, predictive, and prescriptive Analytics
- Usage Characteristics and Customer Dynamics
- Big Data, Dimensionality Reduction, and Real-Time Analytics
- System Models and What-If-Analysis
- Robust Mechanisms for Service Management
- Industry Applications of Service Analytics

### Tutorials

Students will conduct lecture accompanying, guided exercises throughout the semester.

### Workload

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

Course: Service Analytics A [T-WWI-105778]

Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019

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.
6.279 Course: Service Design Thinking [T-WIWI-102849]

**Responsible:** Prof. Dr. Gerhard Satzger  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
M-INFO-102233 - Further Examinations  
M-WIWI-101503 - Service Design Thinking

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<th>Recurrence</th>
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<td>Irregular</td>
<td>3</td>
</tr>
</tbody>
</table>

**Competence Certificate**  

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

**Recommendation**  
This course is held in English – proficiency in writing and communication is required.  
Our past students recommend to take this course at the beginning of the masters program.

**Annotation**  
Due to practical project work as a component of the program, access is limited.  
The module (as well as the module component) spans two semesters. It starts in September every year and runs until end of June in the subsequent year. Entering the program is only possible at its beginning - after prior application in May/June.  
For more information on the application process and the program itself are provided in the module component description and the program’s website (http://sdt-karlsruhe.de).  
Furthermore, the KSRI conducts an information event for applicants every year in May.  
This module is part of the KSRI Teaching Program „Digital Service Systems“. For more information see the KSRI Teaching website: www.ksri.kit.edu/teaching.
6.280 Course: Service Innovation [T-WIWI-102641]

Responsible: Prof. Dr. Gerhard Satzger
Organisation: KIT Department of Economics and Management
Part of: M-INFO-102233 - Further Examinations
M-WIWI-101410 - Business & Service Engineering
M-WIWI-101448 - Service Management
M-WIWI-102806 - Service Innovation, Design & Engineering

Events
| SS 2019 | 2595468 | Service Innovation | 2 SWS | Lecture (V) | Satzger |

Competence Certificate
The assessment consists of an 1h written exam (following §4(2) 1 of the examination regulations) and of assignments during the course as an non exam assessment (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Prerequisites
None

Recommendation
None

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

Description
While innovation in manufacturing or agriculture can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice - while many organizations have a well-understood process for innovating in the product business - innovating in services is often still a fuzzy and complex undertaking.

In this lecture we will
- discuss the state of research
- compare product and service innovation
- understand how innovation diffusion works
- examine case studies of service innovation
- 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).

Annotation
The credits have been changed from 5 to 4.5.
Workload
Total workload: approximately 136 hours
Attendance time: 30 hours
Self-study: 105 hours

Literature
6.281 Course: Service Oriented Computing [T-WIWI-105801]

 Responsible: Prof. Dr. York Sure-Vetter
 Organisation: KIT Department of Economics and Management
 Part of: M-INFO-102233 - Further Examinations
               M-WIWI-101456 - Intelligent Systems and Services
               M-WIWI-102827 - Service Computing

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<tr>
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<td>5</td>
<td>Each summer term</td>
<td>2</td>
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</table>

Competence Certificate
Please note that the exam will be offered to first-time applicants in the winter semester 2018/2019. A last examination possibility exists in the summer semester 2019 (only for repeaters).

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

Prerequisites
None
Below you will find excerpts from events related to this course:

### 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- and Reed Muller-codes) will be presented as well as concatenated codes.
6.283 Course: Simulation Game in Energy Economics [T-WIWI-108016]

Responsible: Dr. Massimo Genoese
Organisation: KIT Department of Economics and Management

Events

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<tr>
<th>Events</th>
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<th>2581025</th>
<th>Simulation Game in Energy Economics</th>
<th>2 SWS</th>
<th>Lecture / Practice (VÜ)</th>
<th>Genoese</th>
</tr>
</thead>
</table>

Competence Certificate
Examination as written assignment and oral presentation (§4 (2), 1 SPO).

Prerequisites
None

Recommendation
Visiting the course "Introduction to Energy Economics"

Annotation
See German version.

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

Simulation Game in Energy Economics
2581025, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

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:
Course: Simulation of Stochastic Systems [T-WIWI-106552]

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

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

**Part of:** 
- M-INFO-102233 - Further Examinations
- M-WIWI-103289 - Stochastic Optimization

**Type**  
Written examination

**Credits**  
4.5

**Recurrence**  
Each summer term

**Version**  
1

**Competence Certificate**
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

**Prerequisites**
None.
6.285 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-INFO-102233 - Further Examinations
M-WIWI-101452 - Energy Economics and Technology

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**Events**

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<td>WS 19/20</td>
<td>2581023</td>
<td>(Smart) Energy Infrastructure</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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</table>

**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
None.

**Annotation**
6.286 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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<td>WS 19/20</td>
<td>2540452</td>
<td>Smart Grid Applications</td>
<td>2</td>
<td>Lecture</td>
<td>Staudt, van Dinther</td>
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<td>WS 19/20</td>
<td>2540453</td>
<td>Übung zu Smart Grid Applications</td>
<td>1</td>
<td>Lecture</td>
<td>Staudt, Golla</td>
</tr>
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</table>

**Competence Certificate**
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The lecture will be read for the first time in winter term 2018/19.
6.287 Course: Social Choice Theory [T-WIWI-102859]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101500 - Microeconomic Theory
- M-WIWI-101504 - Collective Decision Making

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<th>SS 2019</th>
<th>2520537</th>
<th>Social Choice Theory</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Puppe, Müller</th>
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<tr>
<td>SS 2019</td>
<td>2520539</td>
<td>Übung zu Social Choice Theory</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Puppe, Müller</td>
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</table>

**Competence Certificate**

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

**Prerequisites**

None

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

**Social Choice Theory**

2520537, SS 2019, 2 SWS, Language: Englisch, [Open in study portal](#) Lecture (V)

**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:
**6.288 Course: Sociotechnical Information Systems Development [T-WIWI-109249]**

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

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

**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-104403 - Critical Digital Infrastructures

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**Events**

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<td>Sociotechnical Information Systems Development</td>
<td>3 SWS</td>
<td>Practical course (P)</td>
<td>Sunyaev, Sturm</td>
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</table>

**Competence Certificate**

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§4(2), 3 SPO 2015) consists of an implementation and a final thesis documenting the development and use of the application.

**Prerequisites**

None.

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

**7 Sociotechnical Information Systems Development**

2512400, WS 19/20, 3 SWS, Language: Deutsch/Englisch, Open in study portal

**Practical course (P)**

**Description**

The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

**Workload**

4 ECTS = approx. 120 h
6.289 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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6.290 Course: Software Development for Modern, Parallel Platforms [T-INFO-101339]

Responsible: Prof. Dr. Walter Tichy
Organisation: KIT Department of Informatics
Part of: M-INFO-101201 - Software Systems
M-INFO-102233 - Further Examinations

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**Responsible:** Prof. Dr. Andreas Oberweis
**Organisation:** KIT Department of Economics and Management
**Part of:** M-INFO-102233 - Further Examinations
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

**Annotation**
This course was formerly named "Software Technology: Quality Management".

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

**Software Quality Management**
2511208, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

**Annotation**
This course was formerly named "Software Technology: Quality Management".

**Workload**
Lecture 30h
Exercise 15h
Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

**Literature**
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Further literature is given in lectures.

- **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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<td>24164</td>
<td>Software Evolution</td>
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</table>
6.293 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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Events

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<td>1 SWS</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

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

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<td>Spatial Economics</td>
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</table>

Learning Content

- 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

Workload

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

Literature

Steven Brakman, Harry Garretsen, Charles van Marrewijk (2009), The New Introduction to Geographical Economics

Further literature recommendations will be announced in the course of the lecture.
### 6.294 Course: Special Topics in Information Systems [T-WIWI-109940]

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<tr>
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<th>Prof. Dr. Christof Weinhardt</th>
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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.
6.295 Course: Special Topics of Enterprise Information Systems [T-WIWI-102676]

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<th>Prof. Dr. Andreas Oberweis</th>
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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.

Please note that the exam “Special Lecture on Business Information Systems: Industry 4.0” will be offered for the last time in summer semester 2019 (only for repeaters).

**Prerequisites**

None
6.296 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

**Responsible:** Dr. Wolf-Dieter Heller

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101638 - Econometrics and Statistics I
- M-WIWI-101639 - Econometrics and Statistics II

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**Events**

| WS 19/20 | 2521350 | Statistische Modellierung von Allgemeinen Regressionsmodellen | 2 SWS | Lecture (V) | Heller |

**Competence Certificate**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

**Prerequisites**
None

**Recommendation**
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

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

**Statistische Modellierung von Allgemeinen Regressionsmodellen**
2521350, WS 19/20, 2 SWS, Open in study portal

**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
6.297 Course: Stochastic Calculus and Finance [T-WIWI-103129]

**Responsible:** Dr. Mher Safarian

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

**Part of:** M-INFO-102233 - Further Examinations
M-WIWI-101639 - Econometrics and Statistics II

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**Events**

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**Competence Certificate**

The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (3) SPO).

**Prerequisites**

None

**Annotation**

For more information see http://statistik.econ.kit.edu/

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

### Lecture (V)

**Stochastic Calculus and Finance**

2521331, WS 19/20, 2 SWS, Language: Englisch, [Open in study portal](#)

**Description**

The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:


Learning Content
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:


Stochastic processes (Poisson-process, Brownian motion, martingales), stochastic Integral (Integral, quadratic and co-variation, Ito-formula), stochastic differential equation for price-processes, trading strategies, option pricing (Feynman-Kac), neutral risk rating (equivalent martingale measure, Girsanov theorem), term structure models

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

Literature
To be announced in lecture.

Elective literature:
- An Introduction to Stochastic Integration (Probability and its Applications) by Kai L. Chung , Ruth J. Williams , Birkhaueser,
- Methods of Mathematical Finance by Ioannis Karatzas , Steven E. Shreve , Springer 1998
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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**Events**

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**Competence Certificate**
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. 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.
**6.299 Course: Strategic Management of Information Technology [T-WIWI-102669]**

**Responsible:** Thomas Wolf  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
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

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

**Strategic Management of Information Technology**  
2511602, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Learning Content**  
The following topics will be covered: strategic planning of ICT, architecture of ICT, overall planning of ICT, outsourcing, operation and controlling of ICT.

**Literature**
**6.300 Course: Strategy and Management Theory: Developments and “Classics” [T-WIWI-106190]**

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<td>2577921</td>
<td>Strategy and Management Theory: Developments and “Classics” (Master)</td>
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**Competence Certificate**

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

**Prerequisites**

None

**Recommendation**

Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**

This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

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

**Strategy and Management Theory: Developments and "Classics" (Master)**

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<td>WS 19/20</td>
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**Notes**

This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

**Learning Content**

In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

**Workload**

The total workload for this course is approximately 90 hours.

- Lecture: 15 hours
- Preparation of lecture: 75 hours
- Exam preparation: n/a
T 6.301 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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</table>
6.302 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-INFO-102233 - Further Examinations
M-WIWI-101412 - Industrial Production III
M-WIWI-101471 - Industrial Production II

Type: Written examination
Credits: 3.5
Recurrence: Each winter term
Version: 1

Events

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<td>Lecture (V)</td>
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Competence Certificate
The examination will be in form of a written exam acc. to §4(2), 1 ER. Exams are offered in every semester and can be re-examined at every ordinary examination date.

Prerequisites
None

Recommendation
None

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

Supply Chain Management in the automotive industry
2581957, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

Learning Content
- Automotive industry significance
- The automotive supply chain
- Adding value structures of the automotive supply chain and mastering of the production systems as factors of success in the SCM
- Strategic procurement logistics
- Risk management
- Quality engineering and management in the automotive supply chain
- Cost engineering and management in the automotive supply chain
- Purchasing (Supplier selection, contract management)
- Performance measurement of the supply chain / organization

Annotation
None.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be announced in the course.
6.303 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-INFO-102233 - Further Examinations  
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.

**Prerequisites**

None

**Recommendation**

None

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

Supply Chain Management with Advanced Planning Systems  
2581961, SS 2019, 2 SWS, Language: Englisch, Open in study portal

**Learning Content**

1. Introduction to Supply Chain Management  
1.1. Supply Chain Management Fundamentals  
1.2. Supply Chain Management Analytics  

2. Structure of Advanced Planning Systems

3. SAP SCM
3.1. Introduction / SCM Solution Map  
3.2. Demand Planning  
3.3. Supply Network Planning  
3.4. Production Planning and Detailed Scheduling  
3.5. Deployment  
3.6. Transportation Planning and Vehicle Scheduling  
3.7. [Optional] Global Available to Promise

4. SAP SCM in Practice  
4.1. Success Stories  
4.2. SAP Implementation Methodology

**Annotation**

This lecture has 3.5 Credits since summer term 2014.

**Workload**

The total workload for this course is approximately 105 hours. For further information see German version.
Literature
will be announced in the course
6.304 Course: Symmetric Encryption [T-INFO-101390]

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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Events

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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 2019, 2 SWS, Language: Deutsch, 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.
6.305 Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

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

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

**Part of:** M-INFO-102233 - Further Examinations
M-WIWI-102832 - Operations Research in Supply Chain Management

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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. Prerequisite for admission to examination is the succesful completion of the online assessments.

**Prerequisites**

Prerequisite for admission to examination is the succesful completion of the online assessments.

**Recommendation**

None

**Annotation**

The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

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

**Taktisches und operatives SCM**

2550486, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Description**

Since the classical work ‘Theory of the Location of Industries’ of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.

Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

**Learning Content**

The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models). The exercises accompanying the lecture offer the possibility to apply the considered models to practical problems.

**Annotation**

The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.
Literature

Elective Literature

- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
6.306 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

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</table>
### 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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6.308 Course: Technical Conditions Met [T-WIWI-106623]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101453 - Applied Strategic Decisions

Type: Completed coursework  Credits: 0  Recurrence: Each term  Version: 1

Competence Certificate
This module element is intended to record the Bachelor-examination "Introduction to Game Theory". In the master module M-WIWI-101453 "Applied Strategic Decisions", this means that the obligatory course "Advanced Game Theory" is not required.

Prerequisites
None
Course: Technologies for Innovation Management [T-WIWI-102854]

**Responsible:** Dr. Daniel Jeffrey Koch  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- M-WIWI-101507 - Innovation Management  
- M-WIWI-101507 - Innovation Management

**Events**
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**Technologien für das Innovationsmanagement**

**Competence Certificate**

**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:*

**Technologien für das Innovationsmanagement**

*2545106, WS 19/20, 2 SWS, [Open in study portal](#)*

**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.
6.310 Course: Technology Assessment [T-WIWI-102858]

**Responsible:** Dr. Daniel Jeffrey Koch

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101507 - Innovation Management

**Type**
Examination of another type

**Credits**
3

**Recurrence**
Each summer term

**Version**
1

**Competence Certificate**

**Prerequisites**
None

**Recommendation**
Prior attendance of the course Innovation Management is recommended.

**Annotation**
See German version.
6.311 Course: Telecommunication and Internet Economics [T-WIWI-102713]

- **Responsible:** Prof. Dr. Kay Mitusch
- **Organisation:** KIT Department of Economics and Management
- **Part of:** M-INFO-102233 - Further Examinations
  - 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: Deutsch, Open in study portal

**Learning Content**

Among the network sectors the telecommunication and internet sector is the most dynamic one and the one with 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.
**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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6.313 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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**Events**

| WS 19/20 | 24128 | Telematics | 3 SWS | Lecture (V) | Bauer, Friebe, Heseding, Hock, Zitterbart |

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

**Telematics**  
24128, WS 19/20, 3 SWS, Language: Deutsch, [Open in study portal](#)  
**Lecture (V)**

**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.
**6.314 Course: Theory of Endogenous Growth [T-WIWI-102785]**

**Responsible:** Prof. Dr. Ingrid Ott  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-INFO-102233 - Further Examinations  
M-WIWI-101478 - Innovation and Growth  
M-WIWI-101496 - Growth and Agglomeration

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**Competence Certificate**

The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

**Prerequisites**  
None

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

**Annotation**  
Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

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

**Theory of endogenous growth**  
2561503, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

**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:

### 6.315 Course: Topics in Experimental Economics [T-WIWI-102863]

**Responsible:** Prof. Dr. Johannes Philipp Reiß  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-INFO-102233 - Further Examinations  
- 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.
6.316 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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6.317 Course: Transport Economics [T-WIWI-100007]

Responsible: Prof. Dr. Kay Mitusch
Dr. Eckhard Szimba

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101406 - Network Economics
M-WIWI-101468 - Environmental Economics
M-WIWI-101485 - Transport Infrastructure Policy and Regional Development

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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 2019, SWS, Language: Deutsch, Open in study portal

Learning Content
The course shall provide an overview of transport economics. It will be demonstrated, using new microeconomic models, which impacts regulation and pricing in transport have on the economic actions of individuals and logisticans and which benefits and costs apply. The following topics will be discussed:

- demand and supply in transport
- empirical analysis of transport demand
- assessment of transport infrastructure projects
- external effects in transport
- transport policy
- cost structures of transport infrastructure
- Project evaluation from the perspective of the public sector

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

Literature
Will be announced in the lecture.
(For literature to prepare the lecture - see additional literature)

Literature:
T

6.318 Course: Ubiquitous Computing [T-INFO-101326]

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

**Organisation:** KIT Department of Informatics

**Part of:**
- M-INFO-100789 - Ubiquitous Computing
- M-INFO-101203 - Wireless Networking
- M-INFO-101210 - Dynamic IT-Infrastructures
- M-INFO-102233 - Further Examinations
- M-WIWI-101458 - Ubiquitous Computing

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Course: Valuation [T-WIWI-102621]

**Responsible:** Prof. Dr. Martin Ruckes

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101480 - Finance 3
- M-WIWI-101482 - Finance 1
- M-WIWI-101483 - Finance 2
- M-WIWI-101510 - Cross-Functional Management Accounting

**Events**

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<td>WS 19/20 2530212 Valuation</td>
<td>2 SWS</td>
<td>Each winter term</td>
<td>Lecture (V)</td>
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<td>WS 19/20 2530213 Übungen zu Valuation</td>
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<td>Practice (Ü)</td>
<td>Ruckes, Stengel</td>
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</table>

**Competence Certificate**

See German version.

**Prerequisites**

None

**Recommendation**

None

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

**Valuation**

2530212, WS 19/20, 2 SWS, Language: Englisch, [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**

### 6.320 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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<tr>
<td>SS 2019</td>
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<td>Wearable Robotic Technologies</td>
<td>2 SWS</td>
<td>Lecture (V) Asfour, Beigl, Beil</td>
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Below you will find excerpts from events related to this course:

**Wearable Robotic Technologies**  
2400062, SS 2019, 2 SWS, Language: Deutsch/Englisch, [Open in study portal](#)

**Lecture (V)**

**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
6.321 Course: Web Applications and Service-Oriented Architectures (II) [T-INFO-101271]

**Responsible:** Prof. Dr. Sebastian Abeck

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-104061 - Microservice-Based Web Applications

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**Events**

| SS 2019 | 24677 | Web Applications and Service oriented Architectures (II) | 2 SWS | Lecture (V) | Abeck |

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

**Web Applications and Service oriented Architectures (II)**

24677, SS 2019, 2 SWS, Language: Deutsch. [Open in study portal](#)

**Notes**

*Students, who want to take the oral exam of Prof. Abeck, must be present in the first lecture appointment on Wednesday, 26.04.2017 at 9:45 in seminar room 301.*
6.322 Course: Web Science [T-WIWI-103112]

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

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

**Part of:**
- M-INFO-102233 - Further Examinations
- M-WIWI-101455 - Web Data Management
- M-WIWI-101457 - Semantic Technologies
- M-WIWI-102827 - Service Computing

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<th>Lecture (V)</th>
<th>Prof. Sure-Vetter</th>
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<td>Practice (Ü)</td>
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**Competence Certificate**
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

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

**Prerequisites**
None

**Annotation**

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

**Web Science**
2511312, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

**Description**
Web Science is the emergent study of the people and technologies, applications, processes and practices that shape and are shaped by the World Wide Web. Web Science aims to draw together theories, methods and findings from across academic disciplines, and to collaborate with industry, business, government and civil society, to develop our knowledge and understanding of the Web: the largest socio-technical infrastructure in human history.

The lecture provides an introduction to basic concepts of Web Science. Essential theoretical foundations, phenomena and approaches are presented and explained.

**Learning Content**
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

**Workload**
- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours

**Literature**

Information Engineering and Management M.Sc.
Module Handbook as of 22.08.2019
Exercise to Web Science
2511313, WS 19/20, 1 SWS, Language: Englisch, Open in study portal

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

Learning Content
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Workload
The total workload for the lecture Web Science is given out on the description of the lecture.

Literature
**Course: 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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**Events**

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**Competence Certificate**

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

**Prerequisites**

None

**Recommendation**

Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

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

**Workshop Business Wargaming - Analyzing Strategic Interactions**

2577912, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Notes**

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

**Learning Content**

In this course, students simulate and analyze real-life conflict situations using Business Wargaming methods. The students will be able to understand the underlying structure and dynamics of various conflicts, this includes making own conclusions as well as deriving strategic recommendations.

**Workload**

The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a
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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**Events**

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<td>Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)</td>
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</table>

**Competence Certificate**

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

**Prerequisites**

None

**Recommendation**

Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

**Annotation**

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

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

**Workshop aktuelle Themen Strategie und Management (Master)**

2577923, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Notes**

This course is admission restricted. If you were already admitted to another course in the module "Advanced Topics in Strategy and Management" the participation at this course will be guaranteed.

**Learning Content**

In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

**Workload**

The total workload for this course is approximately 90 hours.

Lecture: 15 hours
Preparation of lecture: 75 hours
Exam preparation: n/a

**Workshop Business Wargaming - Analyse strategischer Interaktionen (Master)**

2577922, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal
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