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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 KIT Department of Informatics. We wish you a good start into the new semester!

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

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2 About this handbook

2.1 Notes and rules

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

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

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

2.1.1 Begin and completion of a module

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

2.1.2 Module versions

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

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

2.1.3 General and partial examinations

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

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

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

2.1.4 Types of exams

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

2.1.5 Repeating exams

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

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

2.1.6 Examiners

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

2.1.7 Additional accomplishments

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

2.1.8 Further information

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

Digitalization leads to profound changes in economy and society. The successful design of sustainable digital solutions requires competencies in the fields of information technology, business and law. By studying Information Systems, you will acquire the necessary qualifications for the digital world of work and life of the future. Become a designer of the digital economy and society with excellent, cross-sector career opportunities in start-ups, medium-sized businesses and large companies!

**Why Information Systems at KIT?** Study Information Systems at KIT to successfully combine science and practice of digitization. KIT Information Systems is characterized by an interdisciplinary approach based on an interdisciplinary model. The central unique selling points and arguments for studying Information Systems at KIT are:

- **Options**: You benefit from a high-quality and comprehensive range of courses offered by the two large KIT Departments of Informatics and Economics.
- **Flexibility**: In both the Bachelor's and Master's programmes, you can set your own priorities and develop your personal profile. At KIT you can study both a technical and a more economic profile of Information Systems.
- **Problem solving competence**: The obligatory team project for software development in the Bachelor's programme implements the KIT concept of research-oriented teaching. Students develop functional application software in a team using modern methods and tools. The further development of specific problem-solving skills also plays an important role in the Master's programme, for example in the form of design seminars in cooperation with practical experience.

The study programme Information Systems (B.Sc./M.Sc.) will be offered at the Karlsruhe Institute of Technology (KIT) from the winter semester 2019/20.

Where can I get further information? Further information on the Bachelor's and Master's degree programmes is available at http://www.wirtschaftsinformatik.kit.edu.

3.1 Special features of the Bachelor's programme

**Founded basic education** KIT Information Systems is characterized by an interdisciplinary approach based on a cross-faculty model. The study contents of the first four semesters are organized in five main areas and contain the following contents:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Systems</td>
<td>Basic Terms of Information Systems, Concepts and Systems for Digitization on the Levels of Individual, Group, Organization and Market</td>
</tr>
<tr>
<td>Informatics</td>
<td>Basic Terms of Informatics, Programming, Algorithms, Theoretical Foundations, Communication and Data Management, Applied Computer Science, Software Engineering</td>
</tr>
<tr>
<td>Economics</td>
<td>Business Administration (Marketing, Production, Finance and Accounting), Operations Research and Economics</td>
</tr>
<tr>
<td>Law</td>
<td>Basics of the BGB, Public Law, Commercial Law</td>
</tr>
</tbody>
</table>

**Team Project Software Development** The team project for software development in the 5th semester implements the concept of research-oriented teaching and ensures a high level of practical experience. The students develop functional application software in a team using modern methods and tools.

**Individual choices** The diverse optional modules of the two KIT Departments round off the study programme. Through them, students have the opportunity to deepen their knowledge in accordance with their individual inclinations already during the Bachelor's programme. Students can opt for a focus with 9 or 18 credit points in Informatics or Economics. Further information on specific options can be found in the module handbook.

**International orientation** Organised exchange programmes, free language courses, courses in English and sponsored internships abroad enable students to gain international experience even during their bachelor's studies. Students benefit from numerous partnerships of the two KIT Departments with other universities within and outside Europe, e.g. in Spain, Sweden, France, the USA, Australia and Singapore.

**Degree** The study concludes in the 6th semester with a bachelor thesis. Upon successful completion of the program, students are awarded the academic degree "Bachelor of Science" and have the best chances of being placed in the new Master's program in Informations Systems at KIT.
4 The course of studies

4.1 Qualification goals

The graduates of the interdisciplinary, six-semester Bachelor's programme in Information Systems understand the digital transformation of business and society as a socio-technical process of shaping processes (internal digitisation) and products and services (external digitisation). They are familiar with the subject area of Information Systems in science and practice and have methodologically oriented basic knowledge in the fields of Informatics (theoretical computer science, algorithms, software technology, databases, communication networks), Economics (finance, accounting, production economics, marketing, accounting, economic interrelations of microeconomics) and Law (public law, private law, business private law, constitutional and administrative law, data protection law) as well as Mathematics, Statistics and Operations Research.

Thanks to their sound basic methodological knowledge, graduates are able to name subject-specific basic terms, methods, models and procedures and apply them in an interdisciplinary manner.

KIT Bachelor of Information Systems graduates have in-depth knowledge of Informatics, Economics and Law and understand the interrelationships between these sub-disciplines. They are able to identify, describe and communicate economic, IT and legal problems and topics. In this complex of topics they plan, analyse, compare, evaluate and optimise information systems and infrastructures in business and society. They make decisions, develop subject-specific solutions and implement their innovative ideas using methods and models from the various disciplines, taking into account given resources. They know how to document, present, validate, assess and ensure the quality of the results obtained. Their practical handling of specialist knowledge takes account of social, scientific and ethical aspects.

Due to the interdisciplinarity of the study programme, KIT Bachelor of Information Systems graduates can act effectively at the interface of these three subject areas and shape communication between the disciplines in a targeted manner. The graduates are able to work in a team and master challenges in the field of information and communication technologies.

KIT Bachelor of Information Systems graduates have the ability to work in a professional field in industry, the service sector or trade, to found their own company or to take up a Master’s degree in Information Systems or a related degree.

4.2 Structure according to SPO 2019

The Bachelor's programme in Information Systems has a standard study period of six semesters and comprises 180 credit points. The basic area in the first four semesters is methodically oriented. In the fifth and sixth semesters, students deepen their specialist knowledge, which can be structured according to personal interests and goals within the curriculum.

Figure 2 shows the subject and module structure with the allocation of credit points (LP) and, as an example, a possible distribution of modules and courses in the basic area over the semesters.
In the first four semesters, the modules illustrated from the subjects Information Systems, Informatics, Mathematics, Economics and Law are compulsory.

In the fifth and sixth semesters, elective modules of 9 to 18 credit points must be completed in the subjects of Informatics and Economics. In the subject Law, one or more modules with a total of 6 credit points must be selected. A software development project with 5 credit points is to be completed in the subject Information Systems. Key qualifications are taught integratively. The bachelor thesis comprises 15 credit points and is planned for the 6th semester.

It is up to the individual study plan (taking into account the relevant requirements in the study and examination regulations as well as any module regulations) in which semester the selected module examinations are started or completed.

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**Figure 2: Recommended structure and subject structure of the bachelor's programme in Information Systems (german)**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Leistungspunkte</th>
<th>Wirtschafts-Informatik</th>
<th>Informatik</th>
<th>Mathematik</th>
<th>Wirtschaftswissenschaften</th>
<th>Rechtswissenschaften</th>
<th>Seminar</th>
<th>Abschlussarbeit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (WS)</td>
<td>33</td>
<td>Wirtschafts-Informatik I 4 LP</td>
<td>Grundbegriffe der Informatik* 6 LP</td>
<td>Mathematik I* 8 LP</td>
<td>Volkswirtschaftslehre 5 LP</td>
<td>Einführung in das Privatrecht 5 LP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 (SS)</td>
<td>28</td>
<td>Wirtschafts-Informatik II 4 LP</td>
<td>Algorithmen I 6 LP</td>
<td>Mathematik II* 8 LP</td>
<td>Einführung in das Operations Research 9 LP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (WS)</td>
<td>27</td>
<td></td>
<td>Theoretische Informatik 6 LP</td>
<td>Einführung in die Statistik 10 LP</td>
<td>Wirtschaftsrecht 9 LP</td>
<td>Verfassungs- und Verwaltungsrecht 6 LP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 (SS)</td>
<td>33</td>
<td></td>
<td>Angewandte Informatik 8 LP</td>
<td>Datenbanksysteme 4 LP</td>
<td>Betriebswirtschaftslehre 8 LP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 (WS)</td>
<td>31</td>
<td>Teamprojekt Softwareentwicklung 8 LP</td>
<td>1-2 Wahlmodule 9/18 LP</td>
<td>Wahlmodul 6 LP</td>
<td>1-2 Wahlmodule 9/18 LP</td>
<td>Seminarmodul 3 LP</td>
<td></td>
<td>Bachelorarbeit 15 LP</td>
</tr>
<tr>
<td>6 (SS)</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* Im Rahmen des Moduls ist eine Studienleistung zu erbringen (z.B. verpflichtender Übungschein)
# 5 Field of study structure

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor Thesis</td>
<td>15 CR</td>
</tr>
<tr>
<td>Orientation Exam</td>
<td></td>
</tr>
<tr>
<td>Information Systems</td>
<td>16 CR</td>
</tr>
<tr>
<td>Informatics</td>
<td>54-63 CR</td>
</tr>
<tr>
<td>Mathematics</td>
<td>26 CR</td>
</tr>
<tr>
<td>Economics and Management</td>
<td>31-40 CR</td>
</tr>
<tr>
<td>Law</td>
<td>26 CR</td>
</tr>
<tr>
<td>Seminars</td>
<td>3 CR</td>
</tr>
</tbody>
</table>

## 5.1 Bachelor Thesis

**Mandatory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Module Name</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>M-INFO-104875</td>
<td>Module Bachelor Thesis</td>
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</tr>
</tbody>
</table>

## 5.2 Orientation Exam

**Mandatory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Module Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-WIWI-104843</td>
<td>Orientation Exam</td>
<td>0 CR</td>
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</tbody>
</table>

## 5.3 Information Systems

**Mandatory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Module Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-INFO-104809</td>
<td>Team Project Software Development</td>
<td>8 CR</td>
</tr>
<tr>
<td>M-WIWI-104820</td>
<td>Information Systems I</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-WIWI-104821</td>
<td>Information Systems II</td>
<td>4 CR</td>
</tr>
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</table>
5.4 Informatics

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-INF-101170 Basic Notions of Computer Science</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-101174 Programming</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INF-100030 Algorithms I</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-101189 Theoretical Informatics</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-WIW-101430 Applied Informatics</td>
<td>8 CR</td>
</tr>
<tr>
<td>M-INF-103455 Introduction in Computer Networks</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-104921 Database Systems</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-101175 Software Engineering I</td>
<td>6 CR</td>
</tr>
<tr>
<td>Election block: Wahlmodule Informatik (between 9 and 18 credits)</td>
<td></td>
</tr>
<tr>
<td>M-INF-101220 Algorithms for Planar Graphs</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INF-101173 Algorithms II</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-101237 Algorithmic Methods for Hard Optimization Problems</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INF-101865 Lab: Working with Database Systems</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-101184 Mobile Robots – Practical Course</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-101247 Lab Protocol Engineering</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-101219 Practical Course Computer Engineering: Hardware Design</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-101633 Practical Course Web Applications and Service-Oriented Architectures (I)</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INF-101230 Basic Practical Course for the ICPC-Programming Contest</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-100856 Computer Graphics</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-100803 Real-Time Systems</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-100799 Formal Systems</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-100756 Geometric Basics for Geometry Processing</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INF-100730 Geometric Optimization</td>
<td>3 CR</td>
</tr>
<tr>
<td>M-INF-101235 Introduction to Data and Information Management</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIW-101476 Business Processes and Information Systems</td>
<td>9 CR</td>
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<tr>
<td>M-WIW-1014069 Information Security</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIW-101440 Information Services in Networks</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-INF-100819 Cognitive Systems</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-101248 Curves in CAD</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INF-102557 Lego Mindstorms - Practical Course</td>
<td>4 CR</td>
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<tr>
<td>M-INF-101245 MARS-Based Internship</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-100757 Mechano-Informatics and Robotics</td>
<td>4 CR</td>
</tr>
<tr>
<td>M-INF-100729 Human Computer Interaction</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-101183 Microprocessors I</td>
<td>3 CR</td>
</tr>
<tr>
<td>M-INF-101249 Mobile Computing and Internet of Things</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-INF-100818 Computer Architecture</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-100893 Robotics I - Introduction to Robotics</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-WIW-101438 Semantic Knowledge Management</td>
<td>10 CR</td>
</tr>
<tr>
<td>M-WIW-101439 Semantic Web and Applications</td>
<td>8 CR</td>
</tr>
<tr>
<td>M-INF-100834 Security</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-100833 Software Engineering II</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-100801 Telematics</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-INF-101636 Web Applications and Service-Oriented Architectures (I)</td>
<td>4 CR</td>
</tr>
</tbody>
</table>
### 5.5 Mathematics

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-MATH-104914</td>
<td>Mathematics I</td>
<td>8 CR</td>
</tr>
<tr>
<td>M-MATH-104915</td>
<td>Mathematics II</td>
<td>8 CR</td>
</tr>
<tr>
<td>M-WIWI-101432</td>
<td>Introduction to Statistics</td>
<td>10 CR</td>
</tr>
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</table>

#### Credits: 26

### 5.6 Economics and Management

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-WIWI-101431</td>
<td>Economics</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-WIWI-101418</td>
<td>Introduction to Operations Research</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101492</td>
<td>Business Administration</td>
<td>8 CR</td>
</tr>
<tr>
<td>M-WIWI-101467</td>
<td>Design, Construction and Sustainability Assessment of Buildings</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101460</td>
<td>CRM and Service Management First usage possible until 3/30/2020.</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101402</td>
<td>eFinance</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101434</td>
<td>eBusiness and Service Management</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101435</td>
<td>Essentials of Finance</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101464</td>
<td>Energy Economics</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-102752</td>
<td>Fundamentals of Digital Service Systems</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101424</td>
<td>Foundations of Marketing</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101437</td>
<td>Industrial Production I</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-104913</td>
<td>Information Systems &amp; Digital Business: Servitization</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101513</td>
<td>Human Resources and Organizations</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101466</td>
<td>Real Estate Management</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101425</td>
<td>Strategy and Organization</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101421</td>
<td>Supply Chain Management</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101465</td>
<td>Topics in Finance I</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101423</td>
<td>Topics in Finance II</td>
<td>9 CR</td>
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<tr>
<td>M-WIWI-101422</td>
<td>Specialization in Customer Relationship Management First usage possible until 3/30/2020.</td>
<td>9 CR</td>
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<tr>
<td>M-WIWI-105035</td>
<td>Empirical Finance</td>
<td>9 CR</td>
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<td>M-WIWI-101499</td>
<td>Applied Microeconomics</td>
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<td>M-WIWI-101403</td>
<td>Public Finance</td>
<td>9 CR</td>
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<tr>
<td>M-WIWI-101501</td>
<td>Economic Theory</td>
<td>9 CR</td>
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<tr>
<td>M-WIWI-101668</td>
<td>Economic Policy I</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101599</td>
<td>Statistics and Econometrics</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101413</td>
<td>Applications of Operations Research</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101936</td>
<td>Methodical Foundations of OR</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-103278</td>
<td>Optimization under Uncertainty</td>
<td>9 CR</td>
</tr>
<tr>
<td>M-WIWI-101599</td>
<td>Statistics and Econometrics</td>
<td>9 CR</td>
</tr>
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</table>

**Elective Blocks**
- **Betriebswirtschaftslehre (Business Administration):**
- **Volkswirtschaftslehre (Economics):**
- **Operations Research:**
5.7 Law

<table>
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<tr>
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<td>Introduction to Civil Law</td>
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<tr>
<td>M-INFO-101191</td>
<td>Commercial Law</td>
<td>9 CR</td>
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<tr>
<td>M-INFO-101192</td>
<td>Constitutional and Administrative Law</td>
<td>6 CR</td>
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<td>Intellectual Property and Data Protection</td>
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5.8 Seminars

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<td>M-INFO-101218</td>
<td>Seminar Module Law</td>
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<td>M-WIWI-101826</td>
<td>Seminar Module Economic Sciences</td>
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6 Modules


Responsible: Prof. Dr. Dorothea Wagner
Organisation: KIT Department of Informatics
Part of: Informatics (Wahlmodule Informatik)

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Competence Goal
The goal of this course is to familiarize the students with hard problems and possible approaches to solve them. Online problems may also be part of the course.

Content
There are many practical problems that cannot be solved optimally - some not at all and some not in a reasonable amount of time. An example is the "bin packing problem" where a collection of objects must be packed using a possibly small number of bins. Moreover, problems sometimes arise where knowledge about the future (or even about the present) is incomplete, but a decision is required nevertheless ("online problems"). Regarding bin packing, for example, there must be a point in time when you close the bins and send them away. Even if there are some more objects arriving later.
### 6.2 Module: Algorithms for Planar Graphs [M-INFO-101220]

**Responsible:** Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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#### Mandatory

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<th>Algorithms for Planar Graphs</th>
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### Content

A planar graph is defined as a graph that can be drawn in the plane such that no edges intersect. Planar graphs have many interesting properties that can be used to solve several problems in a particularly simple, fast and elegant way. In addition, some problems that are (NP-)hard in general graphs can be efficiently solved in planar graphs. The lecture presents a selection of these problems and corresponding algorithmic approaches.

### Annotation

The module is offered irregularly.

### Workload

approx. 150 h
# 6.3 Module: Algorithms I [M-INFO-100030]

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

<table>
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### 6.4 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 (Wahlmodule Informatik)

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

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

Election block: Wahlpflichtangebot (between 1 and 2 items)

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<td>T-WIWI-102704</td>
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<td>4.5</td>
<td>Tactical and Operational Supply Chain Management</td>
<td>T-WIWI-102714</td>
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Election block: Ergänzungsangebot (at most 1 item)

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<td>4.5</td>
<td>Modeling and OR-Software: Introduction</td>
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<td>Optimization under Uncertainty</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 Supply Chain Management and their respective optimization problems,
- is acquainted with classical location problem models (in the plane, on networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Prerequisites
At least one of the courses Facility Location and strategic Supply Chain Management and Tactical and operational Supply Chain Management has to be taken.

Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

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

Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in 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
The courses Introduction to Operations Research I and II are helpful.
Annotation
The planned lectures and courses for the next three years are announced online.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
6.6 Module: Applied Informatics [M-WIWI-101430]

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

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

**Part of:** Informatics (mandatory)

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**Mandatory**

| T-WIWI-110338 | Applied Informatics – Modelling | 4 CR | Oberweis, Sure-Vetter |

**Competence Certificate**
The learning control for both courses takes the form of a written examination (60 minutes) in accordance with § 4(2), 1 SPO. The module grade consists of the credit-weighted average of the grades for both courses.

**Competence Goal**
The student should:

- Becomes familiar with relevant modelling languages for describing application domains and aspects of early software system design.
- Gains insight into methods and systems of computer science for the design and development of distributed information systems (supporting electronic business),
- is able to select, design, and apply these methods and systems in a way that is appropriate for the application context.

**Prerequisites**
None.

**Content**
The course Applied Informatics - Modelling [2511030] mainly addresses the early phases of the development of database-supported information systems, distributed systems for information services, intelligent systems and software systems in general. Main topics are modelling concepts and languages for describing application domains as well as static and dynamic aspects of early software system design. The course addresses in detail the following approaches: Entity-Relationship model, advanced aspects of UML, description logic, relational model, Petri nets, and event-driven process chains.

The course Applied Informatics - Internet Computing [2511032] provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

**Recommendation**
Knowledge of the module Basic Notions of Computer Science as well as Algorithms I is expected.

**Workload**
See german version.
6.7 Module: Applied Microeconomics [M-WIWI-101499]

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

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

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<td>4.5 CR</td>
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<td>T-WIWI-102892</td>
<td>Economics and Behavior</td>
<td>4.5 CR</td>
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<td>T-WIWI-102850</td>
<td>Introduction to Game Theory</td>
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<td>Decision Theory</td>
<td>4.5 CR</td>
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<td>Industrial Organization</td>
<td>4.5 CR</td>
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<td>T-WIWI-102739</td>
<td>Public Revenues</td>
<td>4.5 CR</td>
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<td>Economics III: Introduction in Econometrics</td>
<td>5 CR</td>
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<td>T-WIWI-100005</td>
<td>Competition in Networks</td>
<td>4.5 CR</td>
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**Competence Certificate**

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

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

**Competence Goal**

**Students**

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

**Prerequisites**

None.

**Content**

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

**Recommendation**

Completion of the module Economics is assumed.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.8 Module: Basic Notions of Computer Science [M-INFO-101170]

Responsibility: Dr. Sebastian Stüker  
Thomas Worsch  

Organisation: KIT Department of Informatics  
Part of: Informatics (mandatory)  

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<td>Stüker, Worsch</td>
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Competence Goal  
- Students know the most important techniques for definitions and are able to read and understand such definitions.  
- Students know the difference between syntax and semantics.  
- Students know the most important notions from discrete mathematics and computer science and are able to use them for the description of problems and in proofs.

Content  
- informal notion of algorithm, basics of correctness proofs  
- computational complexity measures, hard problems  
- \( O \) notation, master theorem  
- alphabets, words, formal languages  
- finite acceptors, contextfree grammars  
- inductive/recursive definitions, proofs by induction, closure  
- relations and functions  
- graphs

Workload  
180 h
6.9 Module: Basic Practical Course for the ICPC-Programming Contest [M-INFO-101230]

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<th>Prof. Dr. Dorothea Wagner</th>
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Module: Business Administration [M-WIWI-101492]

**Responsible:** Prof. Dr. Marliese Uhlig-Homburg  
Prof. Dr. Christof Weinhardt

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

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

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<td>4 CR Fichtner, Klarmann, Lützkendorf, Ruckes, Schultmann</td>
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<td>T-WIWI-102816</td>
<td>Financial Accounting and Cost Accounting</td>
<td>4 CR Strych</td>
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**Competence Certificate**

The assessments of the courses are written examinations (90 minutes each) according to §4(2), 1 of the examination regulation. 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 be able to

- deal with advanced topics in accounting,
- describe the impacts and features of marketing instruments,
- knows the problem formulation and theories of production management, including the areas of energy, construction, real-estate and ergonomics,
- evaluate information as a competitive factor and is in control of the terminology and the methods to asses information.

**Prerequisites**

None

**Content**

The institutional framework and the modelling and formal description of a company’s decisions play an essential role in this module. This module contains problems in procurement and materials management as well as in logistics. Modern production processes for goods and services are systematically presented. Marketing research and knowledge of the range of marketing instruments are fundamental for decisions in a competitive market environment. Advanced topics in accounting are also taught.

**Recommendation**

It is highly recommended to fulfil this module only after completing the module Foundations in Business Administration.

**Workload**

See German version.
6.11 Module: Business Processes and Information Systems [M-WIWI-101476]

**Responsible:** Prof. Dr. Andreas Oberweis

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

**Part of:** Informatics (Wahlmodule Informatik)

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

- T-WIWI-102697 Business Process Modelling 4.5 CR Oberweis
- T-WIWI-109799 Process Mining 4.5 CR Oberweis

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

- T-WIWI-102668 Enterprise Architecture Management 4.5 CR Wolf
- T-WIWI-104679 Foundations of Mobile Business 4.5 CR Oberweis, Schiefer
- T-WIWI-102675 Computing Lab Business Information Systems 4 CR Oberweis, Sure-Vetter

**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

- design architecture models of enterprise information systems and compare alternative designs,
- explain the concepts and principles of process modeling languages and methods, apply the methods in a concrete situation and evaluate the results.
- choose an appropriate modeling language according to a given context for analysing, modeling and improving business processes.

**Prerequisites**

At least one of the courses Workflowmangement or Modellierung von Geschäftsprozessen has to be attended.

**Content**

Modeling the relevant aspects of a business process is the basis for efficient and effective support of this process in an enterprise information system. Detailed knowledge of languages, methods and software tools for supporting business process modeling is taught in this module.

Additionally fundamentals of software quality management are considered in this module. Maturity models like CMMI or SPICE for evaluation and improvement of a software development process are introduced.

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

Organisation: KIT Department of Informatics
             Part of: Informatics (Wahlmodule Informatik)

<table>
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Mandatory

| T-INFO-101356 | Cognitive Systems | 6 CR | Dillmann, Waibel |
### 6.13 Module: Commercial Law [M-INFO-101191]

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

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### Module: Computer Architecture [M-INFO-100818]

**Mandatory**

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**Responsible:** Prof. Dr.-Ing. Jörg Henkel
Prof. Dr. Wolfgang Karl

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (Wahlmodule Informatik)

**Credits:** 6

**Recurrence:** Each summer term

**Duration:** 1 term

**Language:** Deutsch

**Level:** 3

**Version:** 1
### 6.15 Module: Computer Graphics [M-INFO-100856]

**Responsible:** Prof. Dr.-Ing. Carsten Dachsbacher  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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6.16 Module: Constitutional and Administrative Law [M-INFO-101192]

**Responsible:** Prof. Dr. Nikolaus Marsch  
**Organisation:** KIT Department of Informatics  
**Part of:** Law (mandatory)

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<td>6</td>
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**Workload**

See German version.
**Module: CRM and Service Management [M-WIWI-101460]**

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

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

**Part of:** Economics and Management (Betriebswirtschaftslehre) (Usage until 3/30/2020)

<table>
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**Election block: Wahlpflichtangebot (2 Items)**

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<td>CR</td>
<td>Operative CRM</td>
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**Competence Certificate**

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

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

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

**Competence Goal**

The student

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

**Prerequisites**

None

**Content**

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

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

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

**Annotation**

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

**Workload**

The total amount of work for this module is approximately 270 hours (9 credits). The subdivision is based on the credits of the courses of the module.

The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam periods and the time that is required to achieve the objectives of the module as an average student with an average performance.
6.18 Module: Curves in CAD [M-INFO-101248]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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**Mandatory**  
T-INFO-102067 Curves in CAD  
5 CR Prautzsch

**Competence Goal**  
Basic knowledge about smooth freeform curves, and about their representations in CAD systems and in computer graphics. In particular, knowledge of control points and the geometric properties of Bézier and B-spline representations.

**Content**  
Bézier and B-spline-Technics, polarforms, algorithms of de Casteljau, de Boor and Boehm, Oslo-Algorithm, Stärk’s C^k construction, subdivision, change of representations, intersection algorithms, interpolation with splines, and a bit on tensorproduct surfaces (= curves controlled by curves).
### 6.19 Module: Database Systems [M-INFO-104921]

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

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**Responsible:** Prof. Dr.-Ing. Thomas Lützkendorf

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

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

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<td>T-WIWI-102743</td>
<td>Design, Construction and Sustainability Assessment of Buildings II</td>
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**Competence Certificate**

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

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

**Competence Goal**

The student

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

**Prerequisites**

None

**Content**

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

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

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

**Recommendation**

The combination with the module Real Estate Management is recommended.

Furthermore a combination with courses in the area of

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

is recommended.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
### 6.21 Module: eBusiness and Service Management [M-WIWI-101434]

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Betriebswirtschaftslehre)

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

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<td>T-WIWI-109941</td>
<td>eFinance: Information Systems for Securities Trading</td>
<td>4,5 CR</td>
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<tr>
<td>T-WIWI-109816</td>
<td>Foundations of Interactive Systems</td>
<td>4,5 CR</td>
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<td>4,5 CR</td>
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**Competition Certificate**

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

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

**Competition Goal**

The students

- understand the strategic and operative design of information and information products,
- analyze the role of information on markets,
- evaluate case studies regarding information products,
- develop solutions in teams.

**Prerequisites**

None

**Content**

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

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

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

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

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

**Annotation**

All practical Seminars offered at the IM can be chosen for Special Topics in Information Systems. Please update yourself on www.ism.kit.edu/im/lehre
Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
Module: Economic Policy I [M-WIWI-101668]

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

Mandatory

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Election block: Wahlpflichtangebot (1 item)

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<td>Macroeconomic Theory</td>
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<td>T-WIWI-102739</td>
<td>Public Revenues</td>
<td>4,5</td>
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<td>T-WIWI-102908</td>
<td>Personnel Policies and Labor Market Institutions</td>
<td>4,5</td>
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<td>Competition in Networks</td>
<td>4,5</td>
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Competence Certificate
The module examination takes place in the form of examinations (§4(2),1 SPO) of the selected partial module performance. The examination is carried out separately for each partial module and is described there. It is possible to repeat examinations at any regular examination date.

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

Competence Goal
Students shall be given the ability to

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

Prerequisites
None.

Content

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

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

Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is made according to the credit points of the courses of the module.
6.23 Module: Economic Theory [M-WIWI-101501]

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

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

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

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

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<td>4,5</td>
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<td>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 assessment procedures are described for each course of the module separately.

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

**Competence Goal**
See German version.

**Prerequisites**
None

**Content**
The lecture Introduction to Game Theory focuses on the basics of non-cooperative game theory. Model assumptions, solution concepts and applications are discussed in detail both for simultaneous games (normal form games) and for sequential games (extensive form games). Classical equilibrium concepts like the Nash equilibrium or the subgame perfect equilibrium, but also advanced concepts will be discussed in detail. If necessary, a brief insight into cooperative game theory will also be given.

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

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

**Recommendation**
None

**Annotation**
The course T-WIWI-102609 - Advanced Topics in Economic Theory is currently not available.
Module: Economics [M-WIWI-101431]

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

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

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

### Credits

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### Competence Certificate

The assessment of the module is a written examination according to §4(2), 1 of the examination regulation. The grade of the module corresponds to the grade of this examination.

The main exam takes place subsequent to the lecture. The re-examination is offered at the same examination period. Only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

### Competence Goal

It is the main aim of this module to provide basic knowledge in economic modeling. In particular, the student should be able to analyze market processes and the determinants of market results. Furthermore, she should be able to evaluate the effects of economic policy measures on market behavior and propose alternative, more effective policy measures.

In particular, the student should learn

- to apply simple microeconomic concepts,
- to analyze the structure of real world economic phenomena,
- to judge the possible effects of economic policy measures on the behavior of economic agents (in simple decision problems),
- to suggest alternative policy measures,
- to analyze as a participant of a tutorial simple economic problems by solving written exercises and to present the results of the exercises on the blackboard,
- to become familiar with the basic literature on microeconomics.

The student should gain basic knowledge in order to help in practical problems

- to analyze the structure of microeconomics relationships and to present own problem solutions,
- solve simple economic decision problems.

### Prerequisites

None

### Content

In the two main parts of the course, problems of microeconomic decision making (household and firm behavior) and problems of commodity allocation on markets (market equilibria and their efficiency properties of markets) are discussed. In the final part of the course, basics of imperfect competition (oligopolistic markets) and of game theory as well as welfare economics are presented.

### Annotation

When personal resources are available students' tutorials will be established.

### Workload

See German version.
6.25 Module: eFinance [M-WIWI-101402]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Betriebswirtschaftslehre)

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Election block: Ergänzungsangebot (4.5 credits)

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<td>Derivatives</td>
<td>4.5 CR</td>
</tr>
<tr>
<td>T-WIWI-102646</td>
<td>International Finance</td>
<td>3 CR</td>
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Competence Certificate

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

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

Competence Goal

The students

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

Prerequisites

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

Content

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

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

Annotation

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

Workload

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

**Responsibilities:**
- Prof. Dr. Maxim Ulrich

**Organisation:**
- KIT Department of Economics and Management
- Part of: Economics and Management (Betriebswirtschaftslehre)

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<td>T-WIWI-110216</td>
<td>Empirical Finance</td>
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<td>T-WIWI-110217</td>
<td>Python for Empirical Finance</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 "Empirical Finance" is carried out in form of a written exam (90 minutes), the assessment of "Python for Empirical Finance" is carried out in form of six biweekly Python programming tasks and offered each winter term.

The overall grade of the module is the grade of the written exam weighted with factor 0.75 and the grade for the Python programming tasks weighted with factor 0.25. The resulting grade is truncated after the first decimal.

**Competence Goal**
Students learn the fundamental concepts of modern portfolio theory and their realization in Python. The course focuses on the implementation of statistical concepts in Python, such that students are able to make investment decision under uncertainty after successful completion of this module.

**Content**
The module covers several topics, among them:

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

**Recommendation**
Prior knowledge of statistics is recommended.

**Workload**
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module. The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.
6.27 Module: Energy Economics [M-WIWI-101464]

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

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

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

- **Credits:** 9
- **Recurrence:** Each term
- **Duration:** 1 semester
- **Level:** 3
- **Version:** 3

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<td>Jochem, McKenna</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) about the lecture *Introduction into Energy Economics* [2581010] and one optional lecture of the module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

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

**Competence Goal**

The student

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

**Prerequisites**

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

**Content**

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

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

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

**Recommendation**

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

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
6.28 Module: Essentials of Finance [M-WIWI-101435]

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

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

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

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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

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

**Prerequisites**

None

**Content**

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

**Workload**

The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
M 6.29 Module: Formal Systems [M-INFO-100799]

**Responsible:** Prof. Dr. Bernhard Beckert  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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6 MODULES
Module: Foundations of Marketing [M-WIWI-101424]

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

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Betriebswirtschaftslehre)

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Mandatory
- T-WIWI-102805  Managing the Marketing Mix  4.5 CR  Klarmann
- T-WIWI-102806  Services Marketing and B2B Marketing  3 CR  Klarmann
- T-WIWI-102807  International Marketing  1.5 CR  Feurer

Election block: Ergänzungsangebot (at least 4.5 credits)

- T-WIWI-102806  Services Marketing and B2B Marketing  3 CR  Klarmann
- T-WIWI-102807  International Marketing  1.5 CR  Feurer

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

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

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

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

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

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

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

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

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

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

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

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<td>T-WIWI-105711</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 services from different perspectives and the concept of value creation in service networks
- know about the concepts, methods and tools for the design, modelling, development and management of digital services and are able to use them
- understand the basic characteristics and effects of integrated information system as a an integral element of digital services
- gain experience in group work as well as in the analysis of case studies and the professional presentation of research results
- practice skills in the English language in preparation of jobs in an international environment

**Prerequisites**

None

**Content**

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

**Recommendation**

None

**Annotation**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
### 6.32 Module: Geometric Basics for Geometry Processing [M-INFO-100756]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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### 6.33 Module: Geometric Optimization [M-INFO-100730]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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### 6.34 Module: Human Computer Interaction [M-INFO-100729]

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

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Module: Human Resources and Organizations [M-WIWI-101513]

**Responsible:** Prof. Dr. Petra Nieken

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

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

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

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| T-WIWI-102630 | Managing Organizations                          | 3.5 | Lindstäd |}
| T-WIWI-102908 | Personnel Policies and Labor Market Institutions | 4.5 | Nieken  |
| T-WIWI-102871 | Problem Solving, Communication and Leadership   | 2   | Lindstäd |

**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

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

**Prerequisites**
The course Personalmanagement (Human Resource Management) is compulsory and must be examined.

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

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

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

**Recommendation**
Completion of module Business Administration is recommended.

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

**Workload**
The total workload for this module is approximately 270 hours.
6.36 Module: Industrial Production I [M-WIWI-101437]

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

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

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

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### Credits

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**Election block: Ergänzungsangebot (3,5 credits)**

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### Competence Certificate

The assessment is carried out as partial exams (according to section 4 (2), 1 SPO) of the core course “Fundamentals of Production Management” [2581950] and one further single course of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

### Competence Goal

- Students shall be aware of the important role of industrial production and logistics for production management.
- Students shall use relevant concepts of production management and logistics in an adequate manner.
- Students shall be able to reflect on decision principles in firms and their circumstances in the light of the production management aspects studied.
- Students shall be proficient in describing essential tasks, difficulties and solutions to problems in production management and logistics.
- Students shall be able to describe relevant approaches of modeling production and logistic systems.
- Students shall be aware of the important role of material and energy-flows in production systems.
- Students shall be proficient in using exemplary methods for solving selected problems.

### Prerequisites

None

### Content

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

### Workload

Total effort will account to 270 hours (9 credit points) and can be allocated according to the credit point rating. Therefore, a course with 3.5 credits requires an effort of approximately 105h and a course with 5.5 credits 165h.

The total effort for each course consists of attending lectures and tutorials, examination times and the time an average student needs to prepare himself in order to pass the exam with an average grade.
Module: Information Security [M-WIWI-104069]

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

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

**Part of:** Informatics (Wahlmodule Informatik)

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**Mandatory**

- T-WIWI-110342 Applied Informatics – Information Security 4,5 CR Volkamer

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

- T-WIWI-108439 Advanced Lab Security, Usability and Society 4,5 CR Volkamer
- T-WIWI-109786 Advanced Lab Security 4,5 CR Volkamer

**Competence Certificate**

The 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**

The student
- can explain and apply the basics of information security
- knows appropriate measures to achieve different protection goals and can implement these measures
- can assess the quality of organisational protective measures, i.e. among other things knows what has to be taken into account when using the individual measures
- Understanding the differences between information security in the enterprise and in the private context
- knows the areas of application of a variety of relevant standards and knows their weaknesses
- knows and can explain the problems of information security which may arise from human-machine interaction
- can assess messages about detected security problems in a critical way
- can structure a software project in the field of information security and explain and present results in oral and written form
- can use the techniques of Human Centred Security and Privacy by Design to create user-friendly software.

**Prerequisites**

None

**Content**

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

**Annotation**

This new module can be chosen from summer term 2018.

**Workload**

The total workload for this module is approximately 270 hours.
6.38 Module: Information Services in Networks [M-WIWI-101440]

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

Organisation: KIT Department of Economics and Management
Part of: Informatics (Wahlmodule Informatik)

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Election block: Wahlpflichtangebot (between 9 and 10 credits)

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<td>T-INFO-101276</td>
<td>Data and Storage Management</td>
<td>4 CR</td>
<td>Neumair</td>
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<tr>
<td>T-INFO-101284</td>
<td>Integrated Network and Systems Management</td>
<td>4 CR</td>
<td>Neumair</td>
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<td>T-WIWI-103523</td>
<td>Advanced Lab Informatics</td>
<td>4.5 CR</td>
<td>Oberweis, Sack, Sunyaev, Sure-Vetter, Volkamer, Zöllner</td>
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<tr>
<td>T-WIWI-102874</td>
<td>Semantic Web Technologies</td>
<td>4.5 CR</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.

Prerequisites
None

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

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

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


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

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

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

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

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

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

**Workload**
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Betriebswirtschaftslehre)

**Election block: Wahlpflichtangebot ()**

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<td>T-WIWI-109941</td>
<td>eFinance: Information Systems for Securities Trading</td>
<td>4.5 CR</td>
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<td>T-WIWI-109937</td>
<td>Practical Seminar Platforms</td>
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**Competence Certificate**
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP. The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

**Competence Goal**
Students

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

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

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

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

- **Platform Economy:** Apple, Alphabet, Amazon, Microsoft, und Facebook; five of the most valuable companies worldwide create large portions of their profits employing a digital platform model. This module teaches the key design considerations of digital platforms: their foundations in economic theory, their core components and design aspects, the adequate selection of market mechanisms for achieving certain goals and the role of user behavior in the context of digital platforms. The theoretic foundations are enriched by discussions of several real-world examples, e.g. from the finance sector. Thus, the students are enabled to a) analyze given platforms and make recommendations for improvements and b) independently design new platforms for given use cases.
Workload
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.

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

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

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

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**Election block: Wahlpflichtangebot ()**

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<td>T-WIWI-109816</td>
<td>Foundations of Interactive Systems</td>
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<td>T-WIWI-109939</td>
<td>Practical Seminar Servitization</td>
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<td>Mädche, Satzger</td>
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**Competence Certificate**
The module examination takes place in the form of partial examinations in accordance with § 4 Para. 2 No. 1 - No. 3 SPO via courses of the module amounting to a total of at least 9 LP. The overall score of the module is formed from the credit-weighted scores of the partial examinations and truncated after the first decimal place.

**Competence Goal**

**Students**

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

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

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

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

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

**Workload**
Total effort for 9 credit points: approx. 270 hours. The distribution is based on the credit points of the courses of the module (120-135h for courses with 4.5 credit points). The total number of hours per course results from the effort required to attend lectures and exercises, as well as the examination times and the time required to achieve the learning objectives of the module for an average student for an average performance.
### 6.42 Module: Information Systems I [M-WIWI-104820]

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

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

**Part of:** Information Systems

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**Competence Certificate**

The module examination takes place in the form of a written examination of 60 minutes according to § 4 Abs. 2 via the course "Business Information Systems 1".

**Competence Goal**

The student

- understands information systems and infrastructures as a dynamic interaction of technical and non-technical elements in the generation and use of information,
- knows application areas of information systems and infrastructures in business and society,
- understands digital transformation as a socio-technical design process of (business) processes (internal digitisation) and products/services (external digitisation) in information systems and infrastructures,
- knows different types of information systems and infrastructures in business and society,
- knows the potential benefits of a targeted supply of information in business and society through the appropriate use of information systems and infrastructures.

**Content**

In the lecture "Business Information Systems 1" of the module central basics of information systems are introduced as a scientific discipline. The subject area, basic terms, scientific character and goals as well as methods in science and practice of information systems are introduced. Concepts, methods and theories as well as systems and their engineering design are discussed along the levels of individual, organization and market. The lectures are complemented by Capstone projects with real questions.

**Workload**

- Total effort for 4 credit points: approx. 120 hours.
- Presence time: 40 hours
- Preparation / follow-up: 40 hours
- Exam and exam preparation: 40 hours
6.43 Module: Information Systems II [M-WIWI-104821]

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

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

**Part of:** Information Systems

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**Mandatory**

| T-WIWI-109818 | Information Systems 2 | 4 CR | Mädche |

**Competence Certificate**

The module examination takes place in the form of a written examination of 60 minutes according to § 4 Abs. 2 via the course Business Information Systems 2.

**Competence Goal**

The student

- understands information systems and infrastructures as a dynamic interaction of technical and non-technical elements in the generation and use of information,
- knows application areas of information systems and infrastructures in business and society,
- understands digital transformation as a socio-technical design process of (business) processes (internal digitisation) and products/services (external digitisation) in information systems and infrastructures,
- knows different types of information systems and infrastructures in business and society,
- knows the potential benefits of a targeted supply of information in business and society through the appropriate use of information systems and infrastructures.

**Content**

In the lecture “Business Information Systems II” of the module central basics of information systems are introduced as a scientific discipline. The subject area, basic terms, scientific character and goals as well as methods in science and practice of information systems are introduced. Concepts, methods and theories as well as systems and their engineering design are discussed along the levels of individual, organization and market. The lectures are complemented by Capstone projects with real questions.

**Workload**

Total effort for 4 credit points: approx. 120 hours.  
Presence time: 40 hours  
Preparation / follow-up: 40 hours  
Exam and exam preparation: 40 hours
Module: Intellectual Property and Data Protection [M-INFO-101253]

Responsible: Prof. Dr. Thomas Dreier
Organisation: KIT Department of Informatics
Part of: Law (Wahlimodul Rechtswissenschaft)

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Content

Building onto what the students have learned in law during the first two years of Bachelor studies, the module Law in the third Bachelor years has the purpose of both deepening and specialising the legal studies in areas of practical importance for information economics and management...
### Module: Introduction in Computer Networks [M-INFO-103455]

**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (mandatory)

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<td>4 CR</td>
<td>Zitterbart</td>
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**Competence Certificate**  
Siehe Teillseitung.
6.46 Module: Introduction to Civil Law [M-INFO-101190]

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

**Organisation:** KIT Department of Informatics

**Part of:** Law (mandatory)

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<th>Civil Law for Beginners</th>
<th>5 CR</th>
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</table>
**6.47 Module: Introduction to Data and Information Management [M-INFO-101235]**

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

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<td>Database Systems</td>
<td>4 CR</td>
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**Election block:** Grundlagen des Daten- und Informationsmanagements (at least 1 item as well as at least 5 credits)

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<td>T-INFO-103552</td>
<td>Lab: Working with Database Systems</td>
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<td>T-INFO-101317</td>
<td>Deployment of Database Systems</td>
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**Competence Goal**

The students

- see the necessity of specialised systems for information and data management and are able to define and deploy decision criteria for purchasing such software,
- are aware of the fundamental approaches in information and database systems and are able to judge their potential applications,
- understand database applications and develop simple database applications on their own,
- are able to communicate at a professional level about technical aspects of information and knowledge management

**Prerequisites**

None

**Content**

This module aims at exposing students to modern information and database systems. Beyond fundamental theory and concepts, this module covers the deployment of such technology.
### 6.48 Module: Introduction to Operations Research [M-WIWI-101418]

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

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

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

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<td>9</td>
<td>Each summer term</td>
<td>2 semester</td>
<td>3</td>
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</table>

**Mandatory**

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

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

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

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

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

**Prerequisites**
None

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

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

**Workload**
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
Module: Introduction to Statistics [M-WIWI-101432]

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

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<tr>
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<td>Statistics I</td>
<td>5 CR Grothe, Schienle</td>
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<tr>
<td>T-WIWI-102738</td>
<td>Statistics II</td>
<td>5 CR Grothe, Schienle</td>
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Competence Certificate
The assessment of this module consists of two written examinations according to Section 4(2), 1 of the examination regulation (one for each of the courses Statistics I and II).

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

Competence Goal
See German version.

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

Prerequisites
Keine

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

A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities, transformation of probabilities, parameters of location and dispersion, most important discrete and continuous distributions, covariance and correlation, limit distributions
C. Theory of estimation and testing: sufficiency of statistics, point estimation (optimality, ML-method), internal estimations, linear regression

Recommendation
In some cases, knowledge is required that is imparted within the mathematics module. The module should therefore only be attended if the course Mathematics I for Information Engineering and Management [01360] has been attended beforehand.

It is strongly recommended to attend the course Statistics I [25008/25009] before the course Statistics II [25020/25021].

The lecture will be accompanied by an exercise, a tutorial and a computer internship, which are recommended.

Workload
The total workload for this module is approximately 300 hours. For further information see German version.
### Module: Lab Protocol Engineering [M-INFO-101247]

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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<tr>
<td>T-INFO-102066</td>
<td>Lab Protocol Engineering</td>
<td>4 CR</td>
<td>Zitterbart</td>
</tr>
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</table>
## 6.51 Module: Lab: Working with Database Systems [M-INFO-101865]

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

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<tbody>
<tr>
<td>T-INFO-103552</td>
<td>Lab: Working with Database Systems</td>
<td>4 CR</td>
<td>Böhm</td>
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</table>
### Competence Goal
The participants are able to design and construct a robot with motors and sensors using the Lego Mindstorms kit. The students are familiar with programming the Lego EV3 components using the Java programming language. They are able to understand and solve several key problems in mobile robotics, such as autonomous navigation, detection of landmarks and objects as well as obstacle avoidance. The students know how to efficiently and independently solve problems in a small group in a given time frame and are able to systematically document their work and results.

### Content
In this practical course, teams of three students build and program a mobile robot using Lego Mindstorms and the Java programming language. The robots are challenged to complete a versatile parkour including sections like the traversal of a maze, following a line, crossing a bridge or avoiding obstacle. After initial building of the robots, a section of the parkour will be set up each week and tackled by the robots, for which the students have to prepare their code beforehand. A final race of the robots on the entire parkour will be held at the end of the semester.

### Recommendation
Basic knowledge in JAVA is necessary for successful completion of this course.
6.53 Module: MARS-Based Internship [M-INFO-101245]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (Wahlmodule Informatik)

<table>
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<td>MARS basis lab</td>
<td>4 CR</td>
<td>Prautzsch</td>
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</table>

**Workload**

120 h
**Module: Mathematics I [M-MATH-104914]**

**Responsible:** Prof. Dr. Andreas Rieder  
Prof. Dr. Christian Wieners  

**Organisation:** KIT Department of Mathematics  
**Part of:** Mathematics

<table>
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<tr>
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<td>Mathematics I for Information Systems - Exam</td>
<td>7 CR</td>
<td>Rieder, Weiß, Wieners</td>
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<tr>
<td>T-MATH-109943</td>
<td>Mathematics I for Information Systems - Exercise</td>
<td>1 CR</td>
<td>Rieder, Weiß, Wieners</td>
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</table>

**Competence Certificate**

The assessment in this module consists of

1. a nongraded certificate of exercise following §4(3) of the examination regulation from the exercises to mathematics I (1 credit) and
2. a written examination of 60 minutes on the lectures mathematics I following §4(2), 1 of the examination regulations (7 credits).

The grade of the module is the grade of the written examination.

**Competence Goal**

Mathematical models are an important part in economical sciences. Therefore, the students need a basic knowledge in mathematics. The aim is the instruction in a comprehension of basic methods in analysis and linear algebra.

The students learn

- to use simple concepts and structures in mathematics;
- to recognize the mathematical structure of practical applications and to solve in simple cases mathematical problems;
- to comprehend the mathematical structure of more complex applications;
- to understand the mathematical basics to develop mathematical models for applications in cooperation with experts;
- to explain as a group member in the tutorial elementary mathematical structures and to stimulate in the discussion of examples the success of the group;
- to be in time for the tutorial group and for the preparation of homeworks;
- to work with basic mathematical literature.

The provides the foundations for

- comprehending the mathematical structure of more complex applications;
- developing mathematical models for applications in cooperation with experts;
- constructing algorithmical solutions of mathematical models for applications in cooperation with experts.

**Prerequisites**

None

**Content**

The lectures mathematics I and II give an overview in basic mathematical knowledge which is required to understand modern computer science and economical sciences. Part I consist of linear algebra including the basic algebraic structures, vector spaces and linear mappings. Many algebraic concepts are important for computer science. Part II consists of analysis including an introduction into the calculus of functions of one or several variables.

**Annotation**

None.

**Workload**

See German version.
### Competence Certificate

The assessment in this module consists of

1. a nongraded certificate of exercise following §4(3) of the examination regulation from the exercises to mathematics II (1 credit) and
2. a written examination of 60 minutes on the lectures mathematics II following §4(2), 1 of the examination regulations (7 credits).

The grade of the module is the grade of the written examination.

### Competence Goal

Mathematical models are an important part in economical sciences. Therefore, the students need a basic knowledge in mathematics. The aim is the instruction in a comprehension of basic methods in analysis and linear algebra.

The students learn

- to use simple concepts and structures in mathematics;
- to recognize the mathematical structure of practical applications and to solve in simple cases mathematical problems;
- to comprehend the mathematical structure of more complex applications;
- to understand the mathematical basics to develop mathematical models for applications in cooperation with experts;
- to explain as a group member in the tutorial elementary mathematical structures and to stimulate in the discussion of examples the success of the group;
- to be in time for the tutorial group and for the preparation of homeworks;
- to work with basic mathematical literature.

The provides the foundations for

- comprehending the mathematical structure of more complex applications;
- developing mathematical models for applications in cooperation with experts;
- constructing algorithmical solutions of mathematical models for applications in cooperation with experts.

### Prerequisites

None

### Content

The lectures mathematics I and II give an overview in basic mathematical knowledge which is required to understand modern computer science and economical sciences. Part I consist of linear algebra including the basic algebraic structures, vector spaces and linear mappings. Many algebraic concepts are important for computer science. Part II consists of analysis including an introduction into the calculus of functions of one or several variables.

### Workload

See German version.
6.56 Module: Mechano-Informatics and Robotics [M-INFO-100757]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

<table>
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<td>Deutsch/Englisch</td>
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**Mandatory**

| T-INFO-101294 | Mechano-Informatics and Robotics | 4 CR | Asfour |

**Competence Goal**

Based on the example of robotics students understand the synergistic effects and interdisciplinarity of mechatronics and informatics, the embedded systems, the control, and the methods and the algorithms. They are acquainted with the basic terminology and the methods which are common in robotics, signal processing, action representation, machine learning and cognitive systems. They are capable of applying fundamental state-of-the-art methods and tools for the development and programming of robots. Based on examples originating from current research conducted in the fields of humanoid robotics, the students interactively learn how to identify and formalize problems and tasks and how to develop solutions in an analytical and goal-directed way.

**Content**

The lecture addresses various engineering and algorithmic aspects and topics in robotics which are illustrated and explained based on examples originating from current research conducted in the field of humanoid robotics. First, this lecture gives an introduction into the mathematical fundamentals which are needed to describe a robotic system as well as the basic algorithms commonly applied in motion planning.

Subsequently, models and methods are introduced with which dynamical systems can be formalized and which can be used to encode and represent robot actions. To do so, we will discuss linear time-invariant systems in statespace as well as non-linear systems described as a set of differential equations which are driven by canonical systems. Further topics include perception, exploration, and classification of objects using haptics, and the basics as well as advanced applications of (deep) neural networks. Applications and approaches are presented which address current problems in robotics such as grasping, walking, visual and tactile visual servoing, and the classification of actions.

**Recommendation**

Siehe Teilleistung.
6.57 Module: Methodical Foundations of OR [M-WIWI-101936]

Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Operations Research)

<table>
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Election block: Wahlpflichtangebot (at least 1 item as well as between 4.5 and 9 credits)

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<th>Course Name</th>
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<td>Global Optimization I</td>
<td>4.5 CR</td>
<td>Stein</td>
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<tr>
<td>T-WIWI-103638</td>
<td>Global Optimization I and II</td>
<td>9 CR</td>
<td>Stein</td>
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<tr>
<td>T-WIWI-102724</td>
<td>Nonlinear Optimization I</td>
<td>4.5 CR</td>
<td>Stein</td>
</tr>
<tr>
<td>T-WIWI-103637</td>
<td>Nonlinear Optimization I and II</td>
<td>9 CR</td>
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Election block: Ergänzungsangebot (at most 1 item)

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<th>Course Code</th>
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<th>Lecturer</th>
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<td>Global Optimization II</td>
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<td>T-WIWI-102725</td>
<td>Nonlinear Optimization II</td>
<td>4.5 CR</td>
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<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management</td>
<td>4.5 CR</td>
<td>Nickel</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 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 optimization methods, in particular from nonlinear and from global optimization,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions.

Prerequisites
At least one of the courses "Nonlinear Optimization I" and "Global Optimization I" has to be examined.

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

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Microprocessors I [M-INFO-101183]

**Mandatory**

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**Responsible:** Prof. Dr. Wolfgang Karl

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (Wahlmodule Informatik)

**Credits:** 3

**Recurrence:** Each summer term

**Duration:** 1 semester

**Language:** Deutsch

**Level:** 3

**Version:** 1
Module: Mobile Computing and Internet of Things [M-INFO-101249]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (Wahlmodule Informatik)

<table>
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**Mandatory**

| T-INFO-102061 | Mobile Computing and Internet of Things | 5 CR | Beigl |

**Prerequisites**
None
6.60 Module: Mobile Robots – Practical Course [M-INFO-101184]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (Wahlmodule Informatik)

<table>
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**Mandatory**

| T-INFO-101992 | Mobile Robots – Practical Course | 4 CR | Asfour |

**Competence Goal**

The student is able to understand circuit diagrams and can assemble, test and debug complex PCBs. The student is familiar with programming microcontroller-based embedded systems using the C language and cross compilers. The student is able to use methods for controlling robotic sensors and actuators, can conduct experiments with robots and solve tasks in this context independently and in small groups.

**Content**

In this practical course, students assemble an ASURO robot in groups of two. Each student will be provided with his own robot, which he has to put into operation. While using the robots, a new set of problems will be solved each week. The students will need to prepare for each week given the provided material. Sets of problems be solved using the C language and focus on controlling the robot’s sensors and actuators as well as on the generation of reflex-based behavior. The course ends with a race, where the robots have to tackle an obstacle course.
## 6.61 Module: Module Bachelor Thesis [M-INFO-104875]

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

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### Mandatory

| T-INFO-109907 | Bachelor Thesis  | 15 CR |

### Competence Goal
The student can independently work on a relevant topic in accordance with scientific criteria within the specified time frame. He/she is in a position to research, analyze the information, abstract and identify basic principles and regulations from less structured information.

He/she reviews the task ahead, can select scientific methods and techniques and apply them to solve a problem or identify further potential. This is basically also done under consideration of social and/or ethical aspects.

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

He/she is in a position to clearly structure a research paper and communicate in writing using the technical terminology.

### Content
The Bachelor thesis is a written report which shows that the student can autonomously investigate a scientific problem in Information Engineering and Management. The work load for the Bachelor thesis should be 360h. The recommended project time is 6 months, the maximal project time is 9 months. The Bachelor thesis may also be written in English.
Module: Optimization under Uncertainty [M-WIWI-103278]

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

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

**Part of:** Economics and Management (Operations Research)

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

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<td>T-WIWI-106545</td>
<td>Optimization under Uncertainty</td>
<td>4.5 CR</td>
<td>Rebennack</td>
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**Election block: Ergänzungsangebot (at most 1 item)**

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<th>Instructor</th>
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<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management</td>
<td>4.5 CR</td>
<td>Nickel</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

- denominates and describes basic notions for optimization methods under uncertainty, in particular from stochastic optimization,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems under uncertainty and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions, in particular of stochastic optimization problems.

**Prerequisites**

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

**Content**

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

**Recommendation**

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

**Annotation**

The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

**Workload**

The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
6.63 Module: Orientation Exam [M-WIWI-104843]

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

**Part of:** Orientation Exam

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**Modelled deadline**
This module must be passed until the end of the 3. term.

**Prerequisites**
None
6.64 Module: Practical Course Computer Engineering: Hardware Design [M-INFO-101219]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: Informatics (Wahlmodule Informatik)

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Workload

60 h
### Module: Practical Course Web Applications and Service-Oriented Architectures (I) [M-INFO-101633]

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<th>Responsible</th>
<th>Prof. Dr. Sebastian Abeck</th>
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Module: Programming [M-INFO-101174]

Responsible: Prof. Dr.-Ing. Anne Koziolek
               Prof. Dr. Ralf Reussner
               Prof. Dr.-Ing. Gregor Snelting

Organisation: KIT Department of Informatics

Part of: Informatics (mandatory)

Credits: 5
Recurrence: Each winter term
Duration: 1 semester
Language: Deutsch
Level: 3
Version: 1

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Competence Goal

Students should learn:

- basic structures of the programming language Java and how to apply them; in particular control and simple data structures, object orientation and implementation of basic algorithms
- basics of programming methodology and the ability to autonomously write executable small to medium sized Java programs

Content

- objects and classes
- types, values and variables
- methods
- control structures
- recursion
- references, lists
- inheritance
- input and output
- exceptions
- programming methodology
- implementation of basic algorithms in Java (such as sorting algorithms)
6.67 Module: Public Finance [M-WIWI-101403]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Volkswirtschaftslehre)

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Election block: Wahlpflichtangebot (9 credits)

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<td>Basics of German Company Tax Law and Tax Planning</td>
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<td>Public Revenues</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
See German version.

Content
As a branch of Economics, Public Finance is concerned with the theory and policy of the public sector and its interrelations with the private sector. It analyzes the economic role of the state from a normative as well as from a positive point of view. The normative view examines efficiency- and equity-oriented motives for government intervention and develops fiscal policy guidelines. The positive view explains the actual behavior of economic agents in public sector affairs. Special fields of Public Finance are public revenues, i.e. taxes and public debt, public expenditures for publicly provided goods, and welfare programs.

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

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
6.68 Module: Real Estate Management [M-WIWI-101466]

**Responsible:** Prof. Dr.-Ing. Thomas Lützkendorf  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Betriebswirtschaftslehre)

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

**Prerequisites**

None

**Content**

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

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

**Recommendation**

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

Furthermore a combination with courses in the area of

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

is recommended.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
## 6.69 Module: Real-Time Systems [M-INFO-100803]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour  
Prof. Dr.-Ing. Björn Hein  
Prof. Dr.-Ing. Thomas Längle

**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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

**Responsible:** Prof. Dr.-Ing. Tamim Asfour

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (Wahlmodule Informatik)

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6.71 Module: Security [M/INFO-100834]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (Wahlmodule Informatik)

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Module: Semantic Knowledge Management [M-WIWI-101438]

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

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

**Part of:** Informatics (Wahlmodule Informatik)

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<td>Sure-Vetter</td>
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<tr>
<td>T-WIWI-110340</td>
<td>Applied Informatics – Applications of Artificial Intelligence</td>
<td>4.5</td>
<td>Sure-Vetter</td>
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<tr>
<td>T-WIWI-102697</td>
<td>Business Process Modelling</td>
<td>4.5</td>
<td>Oberweis</td>
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<td>T-WIWI-103523</td>
<td>Advanced Lab Informatics</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**

- know the motives for the application of knowledge management in organizations
- know the basic design dimensions of holistic knowledge management (organization, human, information technology, corporate culture)
- know the main group of IT systems for knowledge management and are able to describe the relevant application scenarios and basic operating modes of these systems
- know how to use the different IT systems for knowledge management in practice
- know the basic standards for the modeling of information and processes and are able to describe their formal structures
- know how to apply the different modeling languages
- know criteria to evaluate the success of knowledge management systems and are able to apply them to assess defined knowledge management scenarios

### Prerequisites

Lecture Semantic Web Technologien [2511310] is mandatory.

### Content

In modern companies the availability and usability of knowledge is an essential factor of success for central managerial tasks and duties such as the improvement of business processes, product innovation and the amelioration of customer satisfaction.

This module illustrates the typical problems of knowledge management in organizations and presents IT methods to approach these questions. The relevant groups of knowledge management systems are analyzed and expanded in the subject areas knowledge representation/semantic modeling and document management/groupware systems.

### Annotation

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

### Workload

The workload is app. 300 hours.
6.73 Module: Semantic Web and Applications [M-WIWI-101439]

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

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

**Part of:** Informatics (Wahlmodule Informatik)

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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 following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Inquiry language SPARQL
- rule languages
- applications

**Workload**
The total workload for this module is approximately 240 hours. For further information see German version.
6.74 Module: Seminar Module Economic Sciences [M-WIWI-101826]

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

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

**Part of:** Seminars

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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.
Module: Seminar Module Informatics [M-INFO-102058]

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

**Part of:** Seminars

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**Election block: Seminar Informatik (1 item)**

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

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

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**Mandatory**

| T-INFO-101997 | Seminar: Legal Studies I | 3 CR | Dreier |
### 6.77 Module: Software Engineering I [M-INFO-101175]

**Responsible:**
- Prof. Dr.-Ing. Anne Koziolek
- Prof. Dr. Ralf Reussner
- Prof. Dr. Walter Tichy

**Organisation:**
KIT Department of Informatics

**Part of:**
Informatics (mandatory)

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**Competence Goal**
The students acquire basic knowledge about the principles, methods and tools of software engineering. They learn how to build and to maintain complex software systems in a systematic way.

**Content**
The content of the lecture is the entire lifecycle of software, spanning project planning, system analysis, cost estimation, design, implementation, validation, verification, and finally the maintaining of software. The covered topics include UML, design patterns, software tools, programming environments and configuration control/versioning systems.

**Workload**
approx. 180 h
6.78 Module: Software Engineering II [M-INFO-100833]

**Responsible:** Prof. Dr.-Ing. Anne Koziolek  
Prof. Dr. Ralf Reussner  
Prof. Dr. Walter Tichy

**Organisation:** KIT Department of Informatics  
Part of: Informatics (Wahlmodule Informatik)

**Credits** 6  
**Recurrence** Each winter term  
**Duration** 1 semester  
**Language** Deutsch  
**Level** 3  
**Version** 1

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| T-INFO-101370 | Software Engineering II | 6 CR  
Koziolek, Reussner, Tichy |

**Content**  
Requirements engineering, software development processes, software quality, software architectures, MDD, Enterprise Software Patterns software maintainability, software security, dependability, embedded software, middleware, statistic testing
6.79 Module: Specialization in Customer Relationship Management [M-WIWI-101422]

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

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

**Part of:** Economics and Management (Betriebswirtschaftslehre) (Usage until 3/30/2020)

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

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<td>Satzger, Weinhardt</td>
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<tr>
<td>4,5 CR</td>
<td>Competition in Networks</td>
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**Competence Certificate**

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

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

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

**Competence Goal**

The student

- knows the scientific methods (from business administration, statistics, informatics) which are most relevant for analytic CRM and he autonomously applies these methods to standard cases,
- gains an overview of the market for CRM software,
- designs, implements, and analyzes operative CRM processes in concrete application domains (e.g. campaign management, call center management,...),
- is aware of the problems of protecting the privacy of customers and the implications of privacy law.

**Prerequisites**

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

**Content**

In this module, analysis methods and techniques for the management and improvement of customer relations are presented. Furthermore, modelling, implementation, introduction, change, analysis and valuation of operative CRM processes are treated. Regarding the first part, we teach analysis methods and techniques suitable for the management and improvement of customer relations. For this goal we treat the principles of customer- and service-oriented management as the foundation of successful customer relationship management. In addition, we show how knowledge of the customer can be used for decision-making at an aggregate level (e.g. planning of sortiments, analysis of customer loyalty, ...). A basic requirement for this is the integration and collection of data from operative processes in a suitably defined data-warehouse in which all relevant data is kept for future analysis. The process of transferring data from the operative systems into the data warehouse is known as the ETL process (Extract / Transform / Load). The process of modelling a data-warehouse as well as the so-called extraction, transformation, and loading process for building and maintaining a data-warehouse are discussed in-depth. The data-warehouse serves as a base for flexible management reporting. In addition, various statistic methods (e.g. cluster analysis, regression analysis, stochastic models, ...) are presented which help in computing suitable key performance indicators or which support decision-making.

Regarding the operative part, we emphasize the design of operative CRM processes. This includes the modelling, implementation, introduction and change, as well as the analysis and evaluation of operative CRM processes. Petri nets and their extensions are the scientific foundation of process modelling. The link of Petri nets to process models used in industry as e.g. UML activity diagrams is presented. In addition, a framework for process innovation which aims at a radical improvement of key business processes is introduced. The following application areas of operative CRM processes are presented and discussed:

- **Strategic marketing processes**
- **Operative marketing processes (campaign management, permission marketing, ...)**
- **Customer service processes (sales force management, field services, call center management, ...)**
Workload
The total amount of work for this module is approximately 270 hours (9 credits). The subdivision is based on the credits of the courses of the module.
The total number of hours per course results from the time of visiting the lectures and exercises, as well as from the exam periods and the time that is required to achieve the objectives of the module as an average student with an average performance.
6.80 Module: Statistics and Econometrics [M-WIWI-101599]

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

Organisation: KIT Department of Economics and Management

Part of: Economics and Management (Volkswirtschaftslehre)
Economics and Management (Statistik)

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Election block: Wahlpflichtangebot (1 item)

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Election block: Ergänzungsangebot (between 1 and 2 items)

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<td>Analysis of Multivariate Data</td>
<td>4,5 CR</td>
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<td>Data Mining and Applications</td>
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<td>T-WIWI-103065</td>
<td>Statistical Modeling of Generalized Regression Models</td>
<td>4,5 CR</td>
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Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

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

Competence Goal
The student

- shows an advanced understanding of Econometric techniques and statistical model building.
- is able to develop Econometric models for applied problems based on available data
- is able to apply techniques and models with statistical software, to interpret results and to judge on different approaches with appropriate statistical criteria.

Prerequisites
None

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

Workload
The total workload for this module is approximately 270 hours.
6.81 Module: Strategy and Organization [M-WIWI-101425]

Responsibility: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: Economics and Management (Betriebswirtschaftslehre)

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Election block: Strategie und Organisation (at least 9 credits)

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<td>Managing Organizations</td>
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<tr>
<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership</td>
<td>2 CR</td>
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<td>T-WIWI-102629</td>
<td>Management and Strategy</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 describes both central concepts of strategic management as well as concepts and models for the design of organizational structures.
- He/she evaluates the strengths and weaknesses of existing organizational structures and regulations on the basis of systematic criteria.
- The management of organizational changes discusses and examines the students by means of case studies to what extent the models can be used in practice and what conditions must apply to them.
- In addition, students plan to use IT to support corporate governance.

Content
The module has a practical and action-oriented structure and provides the student with an up-to-date overview of basic skills concepts and models of strategic management and a realistic picture of possibilities and limitations rational design approaches of the organization.

The focus is firstly on internal and external strategic analysis, concept and sources of competitive advantage, Formulation of competitive and corporate strategies as well as strategy assessment and implementation. Secondly strengths and weaknesses of organizational structures and regulations are assessed on the basis of systematic criteria. Concepts for the organization of organizational structures, the regulation of organizational processes and the control organizational changes are presented.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
6.82 Module: Supply Chain Management [M-WIWI-101421]

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Betriebswirtschaftslehre)

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<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management</td>
<td>4,5 CR</td>
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<td>T-MACH-102089</td>
<td>Logistics - Organisation, Design and Control of Logistic Systems</td>
<td>6 CR</td>
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<td>T-WIWI-109802</td>
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**Election block: Ergänzungsangebot (at most 4 items)**

**Competence Certificate**

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

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

**Competence Goal**

The students

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

**Prerequisites**

*The course T-WIWI-107506 "Platform Economy" has to be taken.*

**Content**

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

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

**Annotation**

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

**Workload**

The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
6.83 Module: Surfaces for Computer Aided Design [M-INFO-101254]

Responsibility: Prof. Dr. Hartmut Prautzsch
Organisation: KIT Department of Informatics
Part of: Informatics (Wahlmodule Informatik)

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Mandatory

| T-INFO-102073 | Surfaces for Computer aided Design | 5 CR | Prautzsch |

Competence Goal
Die Hörer und Hörerinnen der Vorlesung können grundlegende CAGD-Techniken für praktische und theoretische Arbeiten auf entsprechenden Gebieten anwenden und sind in der Lage die Qualität von CAGD-Lösungen zu beurteilen.

Brauchen Sie dann noch für alle meine anderen Module Qualifikationsziele? Für alle diese Module wurden bislang noch keine Qualifikationsziele formuliert.

Content
### 6.84 Module: Team Project Software Development [M-INFO-104809]

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

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

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6.85 Module: Telematics [M-INFO-100801]

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:** Informatics (Wahlmodule Informatik)

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6.86 Module: Theoretical Informatics [M-INFO-101189]

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

**Organisation:** KIT Department of Informatics

**Part of:** Informatics (mandatory)

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**Mandatory**

| T-INFO-103235 | Theoretical Foundations of Computer Science | 6 CR | Müller-Quade, Sanders, Wagner |

**Competence Certificate**

The assessment of the module consists of a written examination according to §4(2), 1 of the examination regulations. The grade of the module corresponds to the grade of the written examination. Further details see the german section.

**Competence Goal**

The student

- has a deeper insight into the fundamentals of theoretical computer science and knows the computation models and proof techniques,
- understands the limits and possibilities of computer science in relation to the solution of definable but only partially predictable problems
- knows basic aspects of computer science in contrast to specific circumstances, such as specific computers or programming languages and also can phrase general statements about the solvability of problems
- is able to apply the proof techniques learned for the specification of systems of computer science and for the systematic design of programs and algorithms

**Content**

There are important problems whose solutions can clearly be defined but one will never be able to calculate such a solution systematically. Other problems are "likely" to be solved only through trial and error. Other topics of the module provide the basis for circuit design, design of compilers, and many others. Most results are rigorously proved. The proof techniques learned by the way are important for the specification of systems of computer science and for the systematic design of programs and algorithms.

The module provides a deep insight into the principles and methods of theoretical computer science. In particular, this will be discussed on the basic properties of Formal Languages as foundations of programming languages and communication protocols (regular, context-free Chomsky hierarchy), machine models (finite automata, pushdown automata, Turing machines, non determinism, and relations to families of formal languages), equivalence of sufficiently powerful computation models (Church’s thesis), non computable important functions (halting problem,...), Gödel’s incompleteness theorem and introduction to complexity theory, NP-complete problems and polynomial reductions.

**Workload**

approx. 210 h
### 6.87 Module: Topics in Finance I [M-WIWI-101465]

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

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

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

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

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

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

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

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

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

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

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

**Workload**
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.
6.88 Module: Topics in Finance II [M-WIWI-101423]

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** Economics and Management (Betriebswirtschaftslehre)

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

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

**Competence Goal**
The student

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

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

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

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

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

**Workload**
The total workload for this module is approximately 270 hours.
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<td>4 CR Abeck</td>
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7 Courses

7.1 Course: Advanced Lab Informatics [T-WIWI-103523]

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

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

**Part of:**  
M-WIWI-101438 - Semantic Knowledge Management  
M-WIWI-101440 - Information Services in Networks

**Type**  
Examination of another type

**Credits**  
4.5

**Recurrence**  
Each term

**Version**  
2

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

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

Information Systems B.Sc.  
Module Handbook as of 22.08.2019
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

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

Practical course (P)
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.
7.2 Course: Advanced Lab Security [T-WIWI-109786]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104069 - Information Security

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Events

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Competence Certificate

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

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

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

Prerequisites

None

Recommendation

Knowledge from the lecture "Information Security" is recommended.

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

Security

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

Notes

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

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

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104069 - Information Security

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Competence Certificate

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

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

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

Prerequisites

None

Recommendation

Knowledge from the lecture "Information Security" is recommended.

Annotation

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

Contents:

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

Learning goals:

The student

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

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

Praktikum Security, Usability and Society
2512551, WS 19/20, 3 SWS, Practical course (P)

Notes

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

Course: Advanced Topics in Economic Theory [T-WIWI-102609]

7.4 Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101501 - Economic Theory

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Competition 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

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.
| **Responsible:** | Prof. Dr. Dorothea Wagner |
| **Organisation:** | KIT Department of Informatics |
| **Part of:** | M-INFO-101237 - Algorithmic Methods for Hard Optimization Problems |
| **Type:** | Oral examination |
| **Credits:** | 5 |
| **Recurrence:** | Irregular |
| **Version:** | 1 |
7.6 Course: Algorithms for Planar Graphs [T-INFO-101986]

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

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101220 - Algorithms for Planar Graphs

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## 7.7 Course: Algorithms I [T-INFO-100001]

**Responsible:** Prof. Dr. Peter Sanders  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-100030 - Algorithms I

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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

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

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

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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. The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

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

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

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

Learning Content
Multivariate Data
Basics of multivariate estimating and testing
Correlation Analysis
Variance Analysis
Factor- and Principal Component Analysis
Discriminant function analysis
Cluster Analysis

Literature
Comprehensive lecture notes
**7.10 Course: Applied Informatics – Applications of Artificial Intelligence [T-WIWI-110340]**

**Responsible:** Prof. Dr. York Sure-Vetter  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101438 - Semantic Knowledge Management

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**Events**

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<tr>
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<td>2511314</td>
<td>Applied Informatics – Applications of Artificial Intelligence</td>
<td>2</td>
<td>Lecture (V)</td>
<td>Sure-Vetter</td>
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<td>2511315</td>
<td>Exercises to Applied Informatics – Applications of Artificial Intelligence</td>
<td>1</td>
<td>Practice (Ü)</td>
<td>Sure-Vetter, Weller</td>
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**Competence Certificate**  
Written Examination (60 min) according to §4, Abs. 2, 1 of the examination regulations or oral examination of 20 minutes according to §4, Abs. 2, 2 of the examination regulations. The exam takes place every semester and can be repeated at every regular examination date.

**Prerequisites**  
None.

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

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

---

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

**Applied Informatics – Applications of Artificial Intelligence**

**2511314, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal** Lecture (V)

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

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

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

**Workload**

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours
Description
Multiple exercises are held that capture the topics, held in the lecture Applications of AI and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

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

Workload
The total workload for the lecture Anwendungen der KI is given out on the description of the lecture.
7 COURSES


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

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

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

**Part of:** M-WIWI-104069 - Information Security

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**Events**

| SS 2019 | 2511550 | Information Security | 2 SWS | Lecture (V) | Volkamer |
| SS 2019 | 2511551 | Exercise Information Security | 1 SWS | Practice (Ü) | Volkamer, Mayer |

**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.

**Annotation**

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

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

### Information Security

2511550, SS 2019, 2 SWS, Open in study portal

**Lecture (V)**

**Description**

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

**Learning Content**

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

**Literature**

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

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101430 - Applied Informatics

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<td>Practice (Ü)</td>
<td>Oberweis, Sure-Vetter, Schiefer, Käfer</td>
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Competence Certificate

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

Prerequisites

None

Annotation

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

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

Applied Informatics - Modelling

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

Description

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

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

Learning Content

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

Workload

Total effort: 120-150 hours
Presence time: 30 hours
Self study: 90-120 hours
Literature


Additional literature:


Exercises to Applied Informatics - Modelling
2511031, WS 19/20, 1 SWS, Language: Deutsch, Open in study portal

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

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

Workload
The total workload for the lecture Applied Informatics I - Modelling is given out on the description of the lecture.

Literature


Additional literature:


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

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

**Part of:** M-WIWI-101430 - Applied Informatics

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<td>Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services</td>
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**Competence Certificate**

The assessment consists of a written exam (120 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

By successful processing the exercises a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

**Prerequisites**

None

**Recommendation**

Knowledge of content of the modules Basic Notions of Computer Science and Algorithms I is expected.

**Annotation**

Replaces from winter semester 2019/2020 T-WIWI-109445 "Applied Informatics - Internet Computing".

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

### Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services

**Lecture (V)**

2511032, SS 2019. 2 SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**

The lecture Applied Computer Science II provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

**Workload**

The total workload for this course is approximately 150 hours. For further information see German version.
Literature
Tba in the lecture.
Course: Auction & Mechanism Design [T-WIWI-102876]

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

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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.

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

Prerequisites
None

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

Annotation
The lecture will be held in English.

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

Auction and Mechanism Design
2560550, SS 2019, 2 SWS, Language: Englisch, Open in study portal

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

Annotation
The lecture will be held in English.

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

Literature
7.15 Course: Bachelor Thesis [T-INFO-109907]

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-104875 - Module Bachelor Thesis

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**Final Thesis**
This course represents a final thesis. The following periods have been supplied:

- **Submission deadline**: 4 months
- **Maximum extension period**: 1 months
- **Correction period**: 6 weeks

This thesis requires confirmation by the examination office.
### 7.16 Course: Basic Notions of Computer Science [T-INFO-101964]

**Responsible:** Dr. Sebastian Stüker  
Thomas Worsch  

**Organisation:** KIT Department of Informatics  

**Part of:** M-INFO-101170 - Basic Notions of Computer Science  

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Information Systems B.Sc.  
Module Handbook as of 22.08.2019
### 7.17 Course: Basic Notions of Computer Science Pass [T-INFO-101965]

**Responsible:** Dr. Sebastian Stüker  
Thomas Worsch  

**Organisation:** KIT Department of Informatics  

**Part of:** M-INFO-101170 - Basic Notions of Computer Science

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### 7.18 Course: Basic Practical Course for the ICPC-Programming Contest [T-INFO-101991]

**Responsible:** Prof. Dr. Dorothea Wagner  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101230 - Basic Practical Course for the ICPC-Programming Contest

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**Events**

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Information Systems B.Sc.  
Module Handbook as of 22.08.2019
### 7.19 Course: Basic Principles of Economic Policy [T-WIWI-103213]

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

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

**Prerequisites**  
None

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

**Annotation**  
**Description:**  
Theory of general economic policy and discussion of current economic policy topics:

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

**Learning objectives:**  
Students learn:

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

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

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

**Media:**  
See course announcement

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

**Basic Principles of Economic Policy**
2560280, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Description**
Theory of general economic policy and discussion of current economic policy issues:

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

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

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

**Literature**
- Lecture slides
- Exercises

**Exercises of Basic Principles of Economic Policy**
2560281, SS 2019, 1 SWS, Language: Deutsch, [Open in study portal](#)

**Literature**
- Lecture slides
- Exercises
7 COURSES

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

Responsible: Gerd Gutekunst
Prof. Dr. Berthold Wigger

Organisation: KIT Department of Economics and Management

Part of:
- M-WIWI-101403 - Public Finance
- M-WIWI-101423 - Topics in Finance II
- M-WIWI-101465 - Topics in Finance I

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

Prerequisites
None

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

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101235 - Introduction to Data and Information Management

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| Events | | | |
|--------|--------|----------------|
| WS 19/20 | 24114 | Big Data Analytics | 3 SWS | Lecture (V) | Böhm |
7.22 Course: Business Administration: Production Economics and Marketing [T-WIWI-102818]

**Responsible:**
- Prof. Dr. Wolf Fichtner
- Prof. Dr. Martin Klarmann
- Prof. Dr.-Ing. Thomas Lützkendorf
- Prof. Dr. Martin Ruckes
- Prof. Dr. Frank Schultmann

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

**Part of:**
M-WIWI-101492 - Business Administration

**Events**

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<td>2 SWS</td>
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<td>Klarmann, Schultmann, Fichtner</td>
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**Competence Certificate**
The assessment consists of a written exam (90 minutes) according to Section 4(2), 1 of the examination regulation.

**Prerequisites**
None

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

**Business Administration: Production Economics and Marketing**
2600024, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal]

**Description**

1. **Marketing:**
Marketing is an organizational function to handle situations, activities, and processes for creating, communicating, and delivering value to customers in a best way. (Customer) relationship management comprises collecting, aggregating, and analyzing information (e.g., developments in the society, changing conditions of markets, alterations w.r.t. buying behavior) to benefit different target groups.

Main topics will deal with market research and optimized application of marketing mix instruments with emphasis on 'marketing and the web', 'innovation management', and 'international marketing'.

2. **Production economics**
In the part of production economics the student will learn basics in the field of production theory, procurement and resource acquisitions, production and operations management and industrial engineering.

Aspects of electrical engineering industry, technological foresights, construction industry and real estate markets will be treated.

3. **Information systems**
In today's economy, information is a competitive factor that calls for an interdisciplinary investigation from economics and business administration, informatics and law. In this part of the lecture, selected topics from information engineering and management and their impact in market competition are presented.

Topics include: Information in a company, Information processing: From an agent to business networks, social networks, service value networks, market engineering.
Learning Content
The course is made up of the following topics:

Marketing
- Foundations of marketing
- Strategic marketing
- Consumer behaviour
- Product
- Price
- Promotion
- Sales
- Marketing Metrics

Production economics
In the part of production economics the student will learn basics in the field of production theory, procurement and resource acquisitions, production and operations management and industrial engineering.

Aspects of energy economics, technological foresights, construction industry and real estate markets will be treated.

Annotation
Key qualifications can be shown in an active participation through presentations of solutions and discussions in the tutorials which accompany the course.

Each part of the course is taught by instructors specialised in the field of that part.

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
Further literature references are announced in the materials to the lecture.
7.23 Course: Business Process Modelling [T-WIWI-102697]

**Responsible:** Prof. Dr. Andreas Oberweis

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

**Part of:**
- M-WIWI-101438 - Semantic Knowledge Management
- M-WIWI-101476 - Business Processes and Information Systems

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**Competence Certificate**

The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

**Prerequisites**

None

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

**Business Process Modelling**

2511210, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**

The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

**Workload**

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

Total: 150h

**Literature**


Further Literature will be given in the lecture.
Below you will find excerpts from events related to this course:

### Business Strategies of Banks

**2530299, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal**

**Lecture (V)**

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

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

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

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

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

**Literature**

*Elective literature:*

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer
7.25 Course: Civil Law for Beginners [T-INFO-103339]

**Responsible:** Prof. Dr. Thomas Dreier  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101190 - Introduction to Civil Law

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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

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<td>Dillmann, Waibel, Stüker, Meißner</td>
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7.27 Course: Competition in Networks [T-WIWI-100005]

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

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

**Part of:**
- M-WIWI-101422 - Specialization in Customer Relationship Management
- M-WIWI-101499 - Applied Microeconomics
- M-WIWI-101668 - Economic Policy I

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<td>Übung zu Wettbewerb in Netzen</td>
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<td>Practice (Ü)</td>
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**Competence Certificate**

Result of success is made by a 60 minutes written examination during the semester break (according to §4(2), 1 ERSC). Examination is offered every semester and can be retried at any regular examination date.

**Prerequisites**

None.

**Recommendation**

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

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

**Competition in Networks**

2561204, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal]

**Description**

Network or infrastructure industries like telecommunication, transport, and utilities form the backbone of modern economies. The lecture provides an overview of the economic characteristics of network industries. The planning of networks is complicated by the multitude of aspects involved (like spatial differentiation and the like). The interactions of different companies - competition or cooperation or both - are characterized by complex interdependencies within the networks: network effects, economies of scale, effects of vertical integration, switching costs, standardization, compatibility etc. appear increasingly in these sectors and even tend to appear in combination. Additionally, government interventions can often be observed, partly driven by the aims of competition policy and partly driven by the aims industrial policy. All these issues are brought up, analyzed formally (in part) and illustrated by several examples in the lecture.

**Workload**

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

**Literature**

Will be announced in the lecture.
7.28 Course: Computer Architecture [T-INFO-101355]

**Responsible:** Prof. Dr.-Ing. Jörg Henkel
Prof. Dr. Wolfgang Karl

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-100818 - Computer Architecture

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7.29 Course: Computer Graphics [T-INFO-104313]

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<td>Übungen zu Computergrafik</td>
<td>SWS</td>
<td>Zirr, Jung, Opitz, Dachsbacher</td>
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### 7.30 Course: Computer Graphics [T-INFO-101393]

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<th>Prof. Dr.-Ing. Carsten Dachsbacher</th>
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<td>Schudeiske, Dachsbacher</td>
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7.31 Course: Computing Lab Business Information Systems [T-WIWI-102675]

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

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

**Part of:** M-WIWI-101476 - Business Processes and Information Systems

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<td>Praktikum Betriebliche Informationssysteme: Realisierung innovativer Dienste für Studierende</td>
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<td>Business Information Systems: Realisation of innovative services</td>
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**Competence Certificate**
The assessment of this course are practical work, presentations and a written thesis according to §4(2), 3 of the examination regulation. Practical work, presentations and a 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 http://www.aifb.uni-karlsruhe.de/Lehre
7 COURSES

7.32 Course: Consulting in Practice [T-INFO-101975]

Responsibility: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-101235 - Introduction to Data and Information Management

Events

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Praxis der Unternehmensberatung

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<td>Böhm, Lang</td>
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Below you will find excerpts from events related to this course:

Praxis der Unternehmensberatung

24664, WS 19/20, 2 SWS, Open in study portal

Description

The market for consulting services grows annually by 20% and is therefore one of the leading growth sectors and professional fields in the future. This trend is in particular driven by the IT industry. Here, widely used standard software moves the focus of the future professional field from software development to consulting. In this context, consulting services have usually a broad definition, reaching from pure IT-focused consulting (e.g., deployment of SAP) to strategic consulting (strategy, organisation etc). In contrast to common rumors, a qualification in business studies is not a must. This opens up a diversified and exciting field with exceptional development perspectives for computer science students. The course deals thematically with the two fields consulting in general and function-specific consulting (with IT consulting as an example).

The structure of the course is oriented along the phases of a consulting project:

- **Diagnosis:** The consultant as an analytic problem solver.
- **Strategic adjustment/redesign of the core processes:** Optimisation/redesign of essential business functionality to solve the diagnosed problems in cooperation with the client.
- **Implementation:** Installation of the solutions in the clients’ organisation for assuring the implementation.

Emphasised topics in the course are:

- **Elementary problem solving:** Problem definition, structuring of problems and focusing through the usage of tools (e.g., logic and hypothesis trees), creative techniques, solution systems etc.
- **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.
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**Responsible:** Prof. Dr. Hartmut Prautzsch

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101248 - Curves in CAD
T 7 Course: Customer Relationship Management [T-WIWI-102595]

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

7.34 Course: Customer Relationship Management [T-WIWI-102595]

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

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

Customer Relationship Management

2540508, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Learning Content

The course begins with an introduction into Service Management as the strategic concept which also covers all CRM applications. The course is divided in the basics of Service Management as well as different topics within this concept like external and internal marketing, quality management and organizational requirements.

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:**
### Course: Data and Storage Management [T-INFO-101276]

**Responsible:** Prof. Dr. Bernhard Neumair  
**Organisation:** KIT Department of Informatics  
**Part of:** M-WIWI-101440 - Information Services in Networks

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

**Responsible:** Rheza Nakhaeizadeh  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101599 - Statistics and Econometrics

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<td>2/4 SWS</td>
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**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
## 7.37 Course: Database Systems [T-INFO-101497]

**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101235 - Introduction to Data and Information Management  
M-INFO-104921 - Database Systems

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**Events**

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<td>24516</td>
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<td>2 SWS</td>
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</table>
### Course: Decision Theory [T-WIWI-102792]

**Responsible:** Prof. Dr. Karl-Martin Ehrhart  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101499 - Applied Microeconomics

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<td>1 SWS</td>
<td>Practice (Ü)</td>
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**Competence Certificate**  
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins. The exam is offered each semester.

**Prerequisites**  
None

**Recommendation**  
Knowledge in mathematics and statistics is required.

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

#### Decision Theory  
2520365, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Description**  
In the first part of the course we deal with problems of decision making under uncertainty and introduce models like expected utility theory, stochastic dominance, risk aversion, and prospect theory. We also consider the empirical validity of the different approaches.

In the second part the concepts learned in the first part are applied for example to search models and Bayesian games.

**Learning Content**  
This course deals with problems of decision making particularly under uncertainty. We introduce the expected utility theory of Neumann/Morgenstern and the prospect theory of Kahnemann/Tversky and discuss the concepts of stochastic dominance, risk aversion, loss aversion, reference points etc. We also consider the empirical validity of the different approaches. Additionally, the lecture provides an introduction to the theory of findings (epistemology), particularly with respect to decision theory.

**Annotation**  
The course "Decision Theory" [2520365] will not be offered any more in M.Sc. from winter term 2015/2016 on.

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

**Literature**

- Ehrhart, K.-M. und S.K. Berninghaus (2012): Decision Theory, Script, KIT.
7.39 Course: Deployment of Database Systems [T-INFO-101317]

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

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101235 - Introduction to Data and Information Management

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<td>Lecture (V) Schäler</td>
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### Course: Derivatives [T-WIWI-102643]

**Responsible:** Prof. Dr. Marliese Uhrig-Homburg  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101402 - eFinance  
M-WIWI-101423 - Topics in Finance II  
M-WIWI-101465 - Topics in Finance I

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#### Events

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#### 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**

**Lecture (V)**

**Description**

The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

**Learning Content**

The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

**Workload**

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

**Literature**


**Elective literature:**

**7.41 Course: Design, Construction and Sustainability Assessment of Buildings I [T-WIWI-102742]**

**Responsible:** Prof. Dr.-Ing. Thomas Lützkendorf  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

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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 two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

A combination with the module Real Estate Management and with engineering science modules in the area of building physics and structural design is recommended.

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

**Design and Construction of Buildings**

2586404, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal]

**Description**

Taking low-energy buildings as an example the course is an introduction to cheap, energy-efficient, resource-saving and health-supporting design, construction and operation of buildings. Questions of the implementation of the principles of a sustainable development within the building sector are discussed on the levels of the whole building, its components, building equipment as well as the materials. Besides technical interrelationships basics dimensioning and various approaches to ecological and economical assessment play a role during the lectures, as well as the different roles of people involved into the building process. Topics are the integration of economical and ecological aspects into the design process, strategies of energy supply, low-energy and passive buildings, active and passive use of solar energy, selection and assessment of construction details, selection and assessment of insulation materials, greened roofs plus health and comfort.

**Learning Content**

Taking low-energy buildings as an example the course is an introduction to cheap, energy-efficient, resource-saving and health-supporting design, construction and operation of buildings. Questions of the implementation of the principles of a sustainable development within the building sector are discussed on the levels of the whole building, its components, building equipment as well as the materials. Besides technical interrelationships basics dimensioning and various approaches to ecological and economical assessment play a role during the lectures, as well as the different roles of people involved into the building process. Topics are the integration of economical and ecological aspects into the design process, strategies of energy supply, low-energy and passive buildings, active and passive use of solar energy, selection and assessment of construction details, selection and assessment of insulation materials, greened roofs plus health and comfort.

**Workload**

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

**Literature**

**Elective literature:**

See german version.
### Course: Design, Construction and Sustainability Assessment of Buildings II [T-WIWI-102743]

**Responsible:** Prof. Dr.-Ing. Thomas Lützkendorf  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101467 - Design, Construction and Sustainability Assessment of Buildings

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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 two times only in the semester in which the lecture is takes place (summer semester). Re-examinations are offered at every ordinary examination date.

**Prerequisites**  
None

**Recommendation**  
A combination with the module Real Estate Management and with engineering science modules from the areas building physics and structural design is recommended.

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

#### Sustainability Assessment of Buildings  
2585404, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Description**  
The course identifies problems concerning the economical and environmental assessment of buildings along their lifecycle and discusses suitable procedures and tools supporting the decision making process. For example, the course addresses topics like operating costs, heat cost allocation, comparisons of heating costs, applied economical assessment methods, life cycle assessment as well as related design and assessment tools (e.g. element catalogues, databases, emblems, tools) and assessment procedures (e.g. carbon footprint, MIPS, KEA), which are currently available.

**Learning Content**  
The course identifies problems concerning the economical and environmental assessment of buildings along their lifecycle and discusses suitable procedures and tools supporting the decision making process. For example, the course addresses topics like operating costs, heat cost allocation, comparisons of heating costs, applied economical assessment methods, life cycle assessment as well as related design and assessment tools (e.g. element catalogues, databases, emblems, tools) and assessment procedures (e.g. carbon footprint, MIPS, KEA), which are currently available.

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

**Literature**  
Elective literature: See German version.
7 COURSES

7.43 Course: Digital Services [T-WIWI-109938]

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

Organisation: KIT Department of Economics and Management

Part of:
- M-WIWI-101422 - Specialization in Customer Relationship Management
- M-WIWI-101434 - eBusiness and Service Management
- M-WIWI-102752 - Fundamentals of Digital Service Systems
- M-WIWI-104913 - Information Systems & Digital Business: Servitization

Events

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Competence Certificate

The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations). By successful completion of the exercises (§4(2), 3 SPO 2007 respectively §4(3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
see below

Annotation

This course replaces T-WIWI-105771 "Foundations of Digital Services A" as of winter semester 2019/2020.

Students who wish to register for the examination in the summer semester 2019 please select the examination "Foundations of Digital Services A".

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

Digital Services (formerly Foundations of Digital Services A)
2595466, SS 2019, 2 SWS, Language: Englisch, Open in study portal

Description

The world is moving more and more towards "service-led" economies: in developed countries services already account for around 70% of gross value added. In order to design, engineer, and manage services, traditional "goods-oriented" models are often inappropriate. In addition, the rapid development of information and communication technology (ICT) pushes the economic importance of services that are rendered electronically (eServices) and, thus, drives competitive changes: increased interaction and individualization open up new dimensions of "value co-creation" between providers and customers; dynamic and scalable service value networks replace static value chains; digital services can be globally delivered and exchanged across today's geographic boundaries; Building on a systematic categorization of (e)Services and on the general notion of "value co-creation", we cover concepts and foundations for engineering and managing IT-based services, allowing for further specialization in subsequent KSRI courses. Topics include service innovation, service economics, service modeling as well as the transformation and coordination of service value networks. In addition, case studies, hands-on exercises and guest lectures will illustrate the applicability of the concepts. English language is used throughout the course to acquaint students with international environments.
Learning Content
The world is moving more and more towards "service-led" economies: in developed countries services already account for around 70% of gross value added. In order to design, engineer, and manage services, traditional "goods-oriented" models are often inappropriate. In addition, the rapid development of information and communication technology (ICT) pushes the economic importance of services that are rendered electronically (eServices) and, thus, drives competitive changes: increased interaction and individualization open up new dimensions of "value co-creation" between providers and customers; dynamic and scalable service value networks replace static value chains; digital services can be globally delivered and exchanged across today's geographic boundaries;

Building on a systematic categorization of (e)Services and on the general notion of "value co-creation", we cover concepts and foundations for engineering and managing IT-based services, allowing for further specialization in subsequent KSRI courses. Topics include service innovation, service economics, service modeling as well as the transformation and coordination of service value networks.

In addition, case studies, hands-on exercises and guest lectures will illustrate the applicability of the concepts. English language is used throughout the course to acquaint students with international environments.

Annotation
Former title "Foundations of Digital Services A"

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

Literature
- Stauss, B. et al. (Hrsg.) (2007), Service Science – Fundamentals Challenges and Future Developments.
- Teboul, (2007), Services is Front Stage.
7.44 Course: Economics and Behavior [T-WIWI-102892]

**Responsible:** Prof. Dr. Nora Szech

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

**Part of:**
- M-WIWI-101499 - Applied Microeconomics
- M-WIWI-101501 - Economic Theory

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 1

**Events**

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</table>

**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. A bonus can be earned through successful participation in the exercise. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

**Prerequisites**
None

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

**Annotation**
The lecture will be held in English.

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

**Economics and Behavior**
2560137, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

**Learning Content**
The course covers topics from behavioral economics with regard to contents and methods. In addition, the students gain insight into the design of economic experiments. Furthermore, the students will become acquainted with reading and critically evaluating current research papers in the field of behavioral economics.

**Annotation**
The lecture will be held in English.

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

**Literature**
7 COURSES

7.45 Course: Economics I: Microeconomics [T-WIWI-102708]

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

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

**Part of:** M-WIWI-101431 - Economics

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**Competition Certificate**
The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation. There may be offered a practice exam in the middle of the semester. The results of this exam may be used to improve the grade of the main exam. A detailed description of the examination modalities will be given by the respective lecturer.

The main exam takes place subsequent to the lecture. The re-examination is offered at the same examination period. As a rule, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

**Prerequisites**
None

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

**Economics I: Microeconomics**
2610012, WS 19/20, 3 SWS, Language: Deutsch, Open in study portal

**Description**
The students learn the basic concepts in Microeconomics and some basics in game theory. The student will understand the working of markets in modern economies and the role of decision making. Furthermore, she should be able to understand simple game theoretic argumentation in different fields of Economics.

In the two main parts of the course problems of microeconomic decision making (household behavior, firm behavior) and problems of commodity allocation on markets (market equilibria and efficiency of markets) as well are discussed. In the final part of the course basics of imperfect competition (oligopolistic markets) and of game theory are presented.

**Workload**
The total workload for this course is approximately 150 hours.

**Literature**
- Pindyck, Robert S./Rubinfeld, Daniel L., Mikroökonomie, 6. Aufl., Pearson. München, 2005
7.46 Course: Economics III: Introduction in Econometrics [T-WIWI-102736]

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

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

**Part of:**
- M-WIWI-101499 - Applied Microeconomics
- M-WIWI-101599 - Statistics and Econometrics

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<td>2520017</td>
<td>Übungen zu VWL III</td>
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**Competence Certificate**
The assessment consists of an 1h written exam according to Section 4(2), 1 of the examination regulation.

**Prerequisites**
None

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

### Economics III: Introduction in Econometrics
2520016, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Lecture (V)**

**Learning Content**
Simple and multiple linear regression (estimating parameters, confidence interval, testing, prognosis, testing assumptions)
Multi equation models
Dynamic models

**Workload**
180 hours (6.0 Credits)

**Literature**
- Schneeweiß: Ökonometrie ISBN 3-7908-0008-2

**Elective literature:**
Additional literature will be suggested in course
### 7.47 Course: eFinance: Information Systems for Securities Trading [T-WIWI-109941]

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101402 - eFinance  
- M-WIWI-101423 - Topics in Finance II  
- M-WIWI-101434 - eBusiness and Service Management  
- M-WIWI-101465 - Topics in Finance I  

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<td>2 SWS</td>
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<td>Weinhardt, Notheisen</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:*

### eFinance: Information Systems for Securities Trading  
2540454, WS 19/20, 2 SWS, Language: Englisch, [Open in study portal]

**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:

### Course: Empirical Finance [T-WIWI-110216]

**Responsible:** Prof. Dr Maxim Ulrich  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-105035 - Empirical Finance

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#### Competence Certificate
The assessment consists of a written exam (90 minutes) according to §4(2) of the examination regulation.

#### Prerequisites
None.

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

### Empirical Finance

**2500001, WS 19/20, 4 SWS, Language: Englisch, Open in study portal**

**Lecture (V)**

#### Description
The aim of this course is to introduce the student to empirical data work in financial economics and investments. Students will learn and implement modern portfolio theory and the most important concepts to estimate expected returns and volatility.

#### Learning Content
The course covers several topics, among them:
- Mean-Variance Portfolio Optimization
- Modeling Distribution of Asset Returns: Factor Models, ARMA-GARCH
- Monte-Carlo Simulation
- Parameter Estimation with Maximum Likelihood and Regressions

#### Workload
The total workload for this course is approximately 180 hours.
Course: Energy Policy [T-WIWI-102607]

### Responsible
Prof. Dr. Martin Wietschel

### Organisation
KIT Department of Economics and Management

### Part of
M-WIWI-101464 - Energy Economics

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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:

#### Energy Policy
2581959, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal]

### 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.
7.50 Course: Enterprise Architecture Management [T-WIWI-102668]

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**Competition Certificate**

Please note that the exam for first writers will be offered for the last time in winter semester 2019/2020. A last examination possibility exists in the summer semester 2020 (only for repeaters).

The assessment of this course is a written (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

**Prerequisites**

None

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

**Enterprise Architecture Management**

| 2511600, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal |

**Learning Content**

The following topics will be covered: components of enterprise architecture, enterprise strategy including methods to develop strategies, business process (re)engineering, methods to implement changes within enterprises (management of change).

**Literature**

- Doppler, K., Lauterburg, Ch.: Change Management. Campus Verlag 1997


7 COURSES

Course: Exercises in Civil Law [T-INFO-102013]

7.51 Course: Exercises in Civil Law [T-INFO-102013]

Responsible: Prof. Dr. Thomas Dreier
Dr. Yvonne Matz

Organisation: KIT Department of Informatics

Part of: M-INFO-101191 - Commercial Law

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</table>
7.52 Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

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

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

**Part of:**
- M-WIWI-101413 - Applications of Operations Research
- M-WIWI-101421 - Supply Chain Management
- M-WIWI-101936 - Methodical Foundations of OR

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**Competence Certificate**
Due to a research semester of Professor Nickel in WS 19/20, the course "Facility Location and Strategic Supply Chain Management" does NOT take place in WS 19/20. In particular, neither WS 19/20 nor SS 20 will offer an exam for the lecture. The follow-up exam to the lecture in WS 18/19 takes place in SS 19 and is exclusively for students in the second examination.

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

The exam takes place in every semester.

Prerequisite for admission to examination is the 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 Accounting and Cost Accounting [T-WIWI-102816]

**Responsible:** Dr. Jan-Oliver Strych

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

**Part of:** M-WIWI-101492 - Business Administration

**Events**

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**Competence Certificate**

The assessment consists of a written exam following §4, Abs. 2.1 of the examination regulation. The examination takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None

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

- 2600002, WS 19/20, 2 SWS, Open in study portal

**Learning Content**

1. Introduction to accounting standards (IFRS, HGB)
2. Annual report and financial statements
3. Selected topics in financial accounting
4. Operational efficiency analysis
5. Financial Statement Analysis
6. Value-based management
7. Taxes
8. Creative accounting and compliance
9. Budgeting and benchmarking
10. Reporting

**Annotation**

It is recommended to have some skills about financial accounting on an introductory level.

**Workload**

The total workload for this course is approximately 120 hours. For further information see German version.
Course: Financial Accounting for Global Firms [T-WIWI-107505]

**Responsible:** Dr. Torsten Luedecke

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

**Part of:** M-WIWI-101423 - Topics in Finance II  
M-WIWI-101465 - Topics in Finance I

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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**
Basic knowledge in corporate finance and accounting.

**Annotation**
New lecture in the winter term 2017/18.

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

**Financial Accounting for Global Firms**
2530242, WS 19/20, 2 SWS, Language: Englisch, [Open in study portal]

**Description**
Increasing globalization coupled with related regulations continues to put pressure on moving towards a common global accounting framework - International Financial Reporting Standards (IFRS). Currently, more than 100 countries use IFRS, so if a firm's business include global transactions, it is critical to know about the impact of IFRS on the financial reporting process and business. In the EU, IFRS are compulsory for listed companies’s consolidated statements but have also gained factual significance for companies without statutory duty to use IFRS. The course introduces the conceptual framework of IFRS, discuss the primary financial statements according to IFRS and explains the underlying principles, concepts, and methods to prepare the financial statements. Special focus is given to some more complex accounting issues related to revenue recognition from contracts with customers, consolidation of different types of intercorporate investments, and foreign currency translation.

**Learning Content**
The lecture covers the following topics:

- The context of financial accounting for global firms
- The mechanics of financial accounting
- Accounting frameworks and concepts
- Content and presentation of financial statements
- Preparing financial statements
- Revenue recognition from contracts
- Tangible and intangible non-current assets
- Financial assets, liabilities, and equity
- Consolidation and the assessment of control
- Investment in associates and joint arrangements
- Business combinations
- Foreign currency translation
Literature
7.55 Course: Financial Econometrics [T-WIWI-103064]

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

Type: Written examination
Credits: 4.5
Recurrence: Irregular
Version: 1

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Annotation
The course takes place each second summer term: 2018/2020....
7.56 Course: Financial Intermediation [T-WIWI-102623]

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

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

**Part of:**
- M-WIWI-101423 - Topics in Finance II
- M-WIWI-101465 - Topics in Finance I

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**Competence Certificate**
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins. The exam is offered each semester.

**Prerequisites**
None

**Recommendation**
None

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

### Financial Intermediation
2530232, WS 19/20, 2 SWS, Language: 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:**
### 7.57 Course: Financial Management [T-WIWI-102605]

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

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

**Part of:** M-WIWI-101435 - Essentials of Finance

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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 at every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

**Recommendation**
Knowledge of the content of the course Business Administration: Finance and Accounting [25026/25027] is recommended.

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

### Financial Management
2530216, SS 2019, 2 SWS, Language: Deutsch,

**Description**
Analytical methods and theories in the field 'Capital investments and financing' with the main focus on:

- Capital Structure
- Dividend policy
- Essentials of valuation
- Investment decisions
- Short term/long term finance
- Working Capital Management

**Learning Content**
Analytical methods and theories in the field of corporate finance with the main focus on:

- Liquidity and Working Capital Management
- Sources of short term/long term finance
- Capital Structure
- Dividend policy

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

**Literature**

**Elective literature:**
7.58 Course: Formal Systems [T-INFO-101336]

**Responsible:** Prof. Dr. Bernhard Beckert  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-100799 - Formal Systems

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7.59 Course: Foundations of Interactive Systems [T-WIWI-109816]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101434 - eBusiness and Service Management
M-WIWI-102752 - Fundamentals of Digital Service Systems
M-WIWI-104911 - Information Systems & Digital Business: Interaction
M-WIWI-104913 - Information Systems & Digital Business: Servitization

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Events
SS 2019 | 2540560 | Foundations of Interactive Systems | 3 SWS | Lecture (V) | Mädche

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
New course starting summer term 2019.

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

Foundations of Interactive Systems
2540560, 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.

With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. This lecture introduces foundations on design processes and principles for interactive systems.

The lecture focuses on foundational concepts, theories, practices and methods for the design of interactive systems. The students get the foundational knowledge to guide the design of interactive systems in business and private life.
7.60 Course: Foundations of Mobile Business [T-WIWI-104679]

Responsible: Prof. Dr. Andreas Oberweis  
Dr.-Ing. Gunther Schiefer

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101476 - Business Processes and Information Systems

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Competence Certificate

The assessment of this course is a written (60 min.) or (if necessary) oral examination according to §4(2) of the examination regulation.

Prerequisites

None

Annotation

Lecture and exercises are integrated.
## 7.61 Course: Fundamentals of Production Management [T-WIWI-102606]

**Responsible:** Prof. Dr. Frank Schultmann  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101437 - Industrial Production I

### Type
- **Written examination**

### Credits
- **5.5**

### Recurrence
- **Each summer term**

### Version
- **1**

### Events

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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

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

#### Fundamentals of Production Management

**2581950, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)**

### Description
This lecture focuses on strategic production management with respect to various economic aspects. Interdisciplinary approaches of systems theory will be used to describe the challenges of industrial production. This course will emphasize the importance of R&D as the central step in strategic corporate planning to ensure future long-term success.

In the field of site selection and planning for firms and factories, attention will be drawn upon individual aspects of existing and greenfield sites as well as existing distribution and supply centres. Students will obtain knowledge in solving internal and external transport and storage problems with respect to supply chain management and disposal logistics.

**Medien und Pflichtliteratur:** können aus der alten Fassung übernommen werden.

### Learning Content
This lecture focuses on strategic production management with respect to various economic aspects. Interdisciplinary approaches of systems theory will be used to describe the challenges of industrial production. This course will emphasize the importance of R&D as the central step in strategic corporate planning to ensure future long-term success.

In the field of site selection and planning for firms and factories, attention will be drawn upon individual aspects of existing and greenfield sites as well as existing distribution and supply centres. Students will obtain knowledge in solving internal and external transport and storage problems with respect to supply chain management and disposal logistics.

### Workload
Total effort required will account for approximately 165h (5.5 credits).

### Literature
will be announced in the course
# 7.62 Course: Geometric Basics for Geometry Processing [T-INFO-101293]

**Responsible:** Prof. Dr. Hartmut Prautzsch  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-100756 - Geometric Basics for Geometry Processing

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<td>Geometrische Grundlagen der Geometrieverarbeitung</td>
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Information Systems B.Sc.  
Module Handbook as of 22.08.2019  
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### 7.63 Course: Geometric Optimization [T-INFO-101267]

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### 7.64 Course: Global Optimization I [T-WIWI-102726]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101413 - Applications of Operations Research  
M-WIWI-101936 - Methodical Foundations of OR

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**Events**

| SS 2019 | 2550134 | Globale Optimierung I | 2 SWS | Lecture (V) | Stein |
| SS 2019 | 2550135 | Übungen zu Globale Optimierung I+II | 1 SWS | Practice (Ü) | Stein |

**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:

**Globale Optimierung I**

2550134, SS 2019, 2 SWS, Open in study portal  
Lecture (V)

**Learning Content**

In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.
Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
7.65 Course: Global Optimization I and II [T-WIWI-103638]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101936 - Methodical Foundations of OR

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**Events**

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</table>

**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:*

**Globale Optimierung I**

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**Learning Content**

In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**

- W. Alt, Numerische Verfahren der konvexen, nichtglatten Optimierung Teubner 2004
- C.A. Floudas, Deterministic Global Optimization Kluwer 2000
- R. Horst, H. Tuy, Global Optimization Springer 1996
Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture.

Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt Numerische Verfahren der konvexen, nichtglatten Optimierung Teubner 2004
- C.A. Floudas Deterministic Global Optimization Kluwer 2000
- R. Horst, H. Tuy Global Optimization Springer 1996
7.66 Course: Global Optimization II [T-WIWI-102727]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101936 - Methodical Foundations of OR

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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 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:

**Globale Optimierung II**  
2550136, SS 2019, 2 SWS, Open in study portal

**Learning Content**

In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify local optimizers, while it is much harder to find globally optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture.

Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

**Literature**

- W. Alt Numerische Verfahren der konvexen, nichtglatten Optimierung Teubner 2004
- C.A. Floudas Deterministic Global Optimization Kluwer 2000
- R. Horst, H. Tuy Global Optimization Springer 1996
### 7.67 Course: Human Resource Management [T-WIWI-102909]

**Responsible:** Prof. Dr. Petra Nieken  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101513 - Human Resources and Organizations

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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. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. In case of a small number of registrations, we might offer an oral exam instead of a written exam.

**Prerequisites**  
None

**Recommendation**  
Completion of module Business Administration is recommended. Basic knowledge of microeconomics, game theory, and statistics is recommended.
7.68 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

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**Events**

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<th>Human-Computer-Interaction</th>
<th>2 SWS</th>
<th>Lecture (V)</th>
<th>Beigl</th>
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### 7.69 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

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| Event Code | 2400095  | Human-Computer-Interaction | 1 SWS | Practice (Ü) | Beigl, Exler |
| SS 2019 | 24659  | Human-Computer-Interaction | 2 SWS | Lecture (V) | Beigl |
7.70 Course: Industrial Organization [T-WIWI-102844]

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

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

**Part of:**
- M-WIWI-101499 - Applied Microeconomics
- M-WIWI-101501 - Economic Theory

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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**
Completion of the module Economics [WW1VWL] is assumed.

**Annotation**
This course is not given in summer 2017.

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

**Industrial Organization**
2560238, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Learning Content**
This course introduces the theory of industrial organization using game theoretical models. The course is divided into two parts: The first part reviews standard market forms (monopoly, oligopoly, perfect competition). The second part discusses more advanced topics including price discrimination, strategic product differentiation, cartel formation, market entry, and research and development.

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

**Literature**

**Compulsory Textbook:**

**Additional Literature:**
7.71 Course: Information Systems 1 [T-WIWI-109817]

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

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

**Part of:** M-WIWI-104820 - Information Systems I
M-WIWI-104843 - Orientation Exam

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**Competence Certificate**
The assessment is monitored
- in the form of a written test (60 minutes) at the end of the lecture period, and by
- editing a Capstone project.
The scoring scheme for the evaluation of the assessment will be announced at the beginning of the course.

**Prerequisites**
None

**Recommendation**
None

**Annotation**
7.72 Course: Information Systems 2 [T-WIWI-109818]

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

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

**Part of:** M-WIWI-104821 - Information Systems II

**Type**
- Written examination

**Credits**
- 4

**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**
New course starting summer term 2020.
7.73 Course: Integrated Network and Systems Management [T-INFO-101284]

**Responsible:** Prof. Dr. Bernhard Neumair

**Organisation:** KIT Department of Informatics

**Part of:** M-WIWI-101440 - Information Services in Networks

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7.74 Course: Intellectual Property and Data Protection [T-INFO-109840]

**Responsible:** Dr. Yvonne Matz

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101253 - Intellectual Property and Data Protection

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7.75 Course: International Finance [T-WIWI-102646]

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

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

**Part of:**
- M-WIWI-101402 - eFinance
- M-WIWI-101423 - Topics in Finance II
- M-WIWI-101465 - Topics in Finance I

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**Competence Certificate**

See German version.

**Prerequisites**

None

**Recommendation**

None

**Annotation**

See German version.

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

**International Finance**

2530570, SS 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:_

7.76 Course: International Marketing [T-WIWI-102807]

**Responsible:** Dr. Sven Feurer

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

**Part of:** M-WIWI-101424 - Foundations of Marketing

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### Competence Certificate

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

### Prerequisites

None

### Annotation

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

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

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<thead>
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<td>WS 19/20</td>
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</table>

### Learning Content

Doing marketing abroad creates a number of significant new challenges for firms. This class is intended to prepare you for meeting these challenges. In the first session, we will discuss the peculiarities of international marketing. The next five sessions will then be dedicated to methods that can be used to address them. For instance, we will look at the following issues:

- Internationalization strategies
- Market entry strategies
- Standardization vs. individualization (e.g. regarding products, prices, and communication)
- Measurement equivalence in international market research

In the final session, we will apply this knowledge to the case of Wal Mart. In particular, Wal Mart, despite being the largest retailing company worldwide, failed to successfully enter the German Market. We will discuss Wal Mart’s failure using the methods taught in the weeks before.

### Annotation

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

### Workload

The total workload for this course is approximately 45.0 hours. For further information see German version.

### Literature

### 7.77 Course: Introduction in Computer Networks [T-INFO-102015]

**Responsible:** Prof. Dr. Martina Zitterbart  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-103455 - Introduction in Computer Networks

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<td>Lecture (V)</td>
<td>Friebe, Gerhard, Jung, Zitterbart</td>
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<td>SS 2019</td>
<td>Übung zu Einführung in Rechnernetze</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
<td>Friebe, Gerhard, Jung, Zitterbart</td>
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</table>
7.78 Course: Introduction to Energy Economics [T-WIWI-102746]

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

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

**Part of:** M-WIWI-101464 - Energy Economics

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**Events**

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<td>Introduction to Energy Economics</td>
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<td>Lecture (V)</td>
<td>Fichtner, Sandmeier, Lehmann</td>
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<td>2581011</td>
<td>Übungen zu Einführung in die Energiewirtschaft</td>
<td>2</td>
<td>Practice (Ü)</td>
<td>Lehmann, Kleinebrahm, Jochem, Sandmeier</td>
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</table>

**Competence Certificate**

The assessment consists of a written exam (90 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**

None.

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

**Introduction to Energy Economics**

2581010, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Learning Content**

1. Introduction: terms, units, conversions
2. The energy carrier gas (reserves, resources, technologies)
3. The energy carrier oil (reserves, resources, technologies)
4. The energy carrier hard coal (reserves, resources, technologies)
5. The energy carrier lignite (reserves, resources, technologies)
6. The energy carrier uranium (reserves, resources, technologies)
7. The final carrier source electricity
8. The final carrier source heat
9. Other final energy carriers (cooling energy, hydrogen, compressed air)

**Workload**

The total workload for this course is approximately 165.0 hours. For further information see German version.

**Literature**

Complementary literature:

- Feess, Eberhard. Umweltökonomie und Umweltpolitik. ISBN 3-8006-2187-8
### Course: Introduction to Game Theory [T-WIWI-102850]

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

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

**Part of:**
- M-WIWI-101499 - Applied Microeconomics
- M-WIWI-101501 - Economic Theory

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each summer term

**Version**
- 1

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<th>2 SWS</th>
<th>Lecture (V)</th>
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<td>2520526</td>
<td>Übungen zu Einführung in die Spieltheorie</td>
<td>1 SWS</td>
<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 the recess period and can be resited at every ordinary examination date.

**Prerequisites**
None

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

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

#### Introduction to Game Theory
2520525, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Lecture (V)**

**Learning Content**
The course focusses on non-cooperative game theory. It discusses models, solution concepts, and applications for simultaneous games as well as sequential games. Various solution concepts, e.g., Nash equilibrium and subgame-perfect equilibrium, are introduced along with more advanced concepts. A short introduction to cooperative game theory is given if there is sufficient time.

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

**Literature**

**Compulsory textbook:**

**Additional Literature:**
7.80 Course: Introduction to Operations Research I and II [T-WIWI-102758]

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

Organisation:
KIT Department of Economics and Management

Part of:
M-WIWI-101418 - Introduction to Operations Research

Type
Written examination

Credits
9

Recurrence
see Annotations

Version
1

Events

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<td>2 SWS</td>
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Competence Certificate
The assessment of the module is carried out by a written examination (120 minutes) according to Section 4(2), 1 of the examination regulation.
In each term (usually in March and July), one examination is held for both courses.
The overall grade of the module is the grade of the written examination.

Prerequisites
None

Recommendation
Mathematics I und II. Programming knowledge for computing exercises.
It is strongly recommended to attend the course Introduction to Operations Research I [2550040] before attending the course Introduction to Operations Research II [2530043].

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

Introduction to Operations Research I
2550040, SS 2019, 2+2 SWS, Language: Deutsch, Open in study portal

Description
Examples for typical OR problems.
Linear Programming: Basic notions, simplex method, duality, special versions of the simplex method (dual simplex method, three phase method), sensitivity analysis, parametric optimization, game theory.
Graphs and Networks: Basic notions of graph theory, shortest paths in networks, project scheduling, maximal and minimal cost flows in networks.

Learning Content
Examples for typical OR problems.
Linear Programming: Basic notions, simplex method, duality, special versions of the simplex method (dual simplex method, three phase method), sensitivity analysis, parametric optimization, multicriteria optimization.
Graphs and Networks: Basic notions of graph theory, shortest paths in networks, project scheduling, maximal flows in networks.

Workload
Berechnung des Arbeitsaufwands eines durchschnittlichen Studenten um die Lernziele zu erreichen. (Intern)
Eine Vernetzung von learningoutcomes (Wissen (content), Kompetenzen (skills)) und levels mit dem dafür geschätzten Arbeitsaufwand eines durchschnittlichen Studenten ist anzustreben.
Literature

7.81 Course: Introduction to Public Finance [T-WIWI-102877]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101403 - Public Finance

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Events

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<td>2560131</td>
<td>Introduction to Public Finance</td>
<td>3 SWS</td>
<td>Lecture (V)</td>
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Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO 2015.

Prerequisites
None

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

Introduction to Public Finance
2560131, WS 19/20, 3 SWS, Language: Deutsch, Open in study portal

Learning Content
The course Introduction to Public Finance provides an overview of the fundamental issues in public economics. The first part of the course deals with normative theories about the economic role of the state in a market economy. Welfare economics theory is offered as a base model, with which alternative normative theories are compared and contrasted. Within this theoretical framework, arguments concerning efficiency and equity are developed as justification for varying degrees of economic intervention by the state. The second part of the course deals with the positivist theory of public economics. Processes of public decision making are examined and the conditions that lead to market failures resulting from collective action problems are discussed. The third part of the course examines a variety of public spending programs, including social security systems, the public education system, and programs aimed at reducing poverty. The fifth part of the course addresses the key theoretical and political issues associated with fiscal federalism.

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

Literature
7.82 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

**Responsible:** Prof. Dr. Steffen Rebennack  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-103278 - Optimization under Uncertainty

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<th>2 SWS</th>
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<td>2550471</td>
<td>Übung zur Einführung in die Stochastische Optimierung</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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**Competence Certificate**
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

**Prerequisites**
None.
### Competence Certificate

The assessment consists of a written exam (75 min) according to Section 4(2), 1 of the examination regulation. The examination takes place in every semester. Re-examinations are offered at every ordinary examination date. A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by up to one grade level (0.3 or 0.4). Details will be announced in the lecture.

### Prerequisites

None

### Recommendation

Knowledge of Business Administration: Finance and Accounting [2610026] is recommended.

---

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

#### Investments

**Description**

The lecture deals with investment decisions under uncertainty, where the main emphasis is on investment decisions on stock markets. After a discussion of the basic questions of corporate valuation, the lecture focuses on portfolio theory. After that, risk and return in equilibrium are derived using the Capital Asset Pricing Model and the Arbitrage Pricing Theory, followed by an introduction into derivatives markets, especially forwards and futures. The lecture concludes with investments on bond markets.

**Learning Content**

The lecture deals with investment decisions under uncertainty, where the main emphasis is on investment decisions on stock markets. After a discussion of the basic questions of corporate valuation, the lecture focuses on portfolio theory. After that, risk and return in equilibrium are derived using the Capital Asset Pricing Model and the Arbitrage Pricing Theory. The lecture concludes with investments on bond markets.

**Workload**

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

**Literature**

Elective literature:

7.84 Course: Lab Protocol Engineering [T-INFO-102066]

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

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101247 - Lab Protocol Engineering

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<td>Basispraktikum Protocol Engineering</td>
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### Course: Lab: Working with Database Systems [T-INFO-103552]

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<th>Responsible:</th>
<th>Prof. Dr.-Ing. Klemens Böhm</th>
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<td>Organisation:</td>
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<td>M-INFO-101235 - Introduction to Data and Information Management</td>
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</table>
7.86 Course: Logistics - Organisation, Design and Control of Logistic Systems [T-MACH-102089]

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-WIWI-101421 - Supply Chain Management

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<th>3 SWS</th>
<th>Lecture (V)</th>
<th>Furmans</th>
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**Competence Certificate**

The assessment consists of a 90 minutes written examination (according to §4(2), 1 of the examination regulation).

**Prerequisites**

None

**Recommendation**

Required are lectures on "Linear Algebra" and "Stochastic".

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

**V Logistics - Organisation, Design, and Control of Logistic Systems**

2118078, SS 2019, 3 SWS, Language: Deutsch, [Open in study portal](#)

**Description**

**Media:**

Blackboard, LCD projector, in exercises also PCs.
Learning Content

Introduction

- historical overview
- lines of development

Structure of logistics systems

Distribution logistics

- location planning
- Vehicle Routing Planning
- distribution centers

Inventory management

- demand forecasting
- Inventory management policies
- Bullwhip effect

Production logistics

- layout planning
- material handling
- flow control

Supply Management

- information flow
- transportation organization
- controlling and development of a logistics system
- co-operation mechanisms
- Lean SCM
- SCOR model

Identification Technologies

Workload

180 hrs

Literature

- Arnold/Isermann/Kuhn/Tempelmeier. Handbuch Logistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexl. Logistik, Standorte, Oldenbourg Verlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Tempelmeier. Bestandsmanagement in Supply Chains, Books on Demand 2006
**7.87 Course: Logistics and Supply Chain Management [T-WIWI-102870]**

**Responsible:** Dr. Marcus Wiens  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101437 - Industrial Production I

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<td>Logistics and Supply Chain Management</td>
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<td>2581997</td>
<td>Übung zu Logistics and Supply Chain Management</td>
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<td>Diehlmann, Lüttenberg</td>
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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

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

**Logistics and Supply Chain Management**

2581996, SS 2019, 2 SWS, Language: Englisch, [Open in study portal](#)

**Learning Content**

- Introduction: Basic Terms and Concepts
- Logistics Systems and Supply Chain Management
- Supply Chain Risk Management
- Extensions and Applications

**Workload**

Total effort required will account for approximately 105h (3.5 credits).

**Literature**

will be announced in the course
**7.88 Course: Macroeconomic Theory [T-WIWI-109121]**

**Responsible:** Prof. Dr. Johannes Brumm  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101501 - Economic Theory  
M-WIWI-101668 - Economic Policy I

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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 paragraph 2 Nr. 1 of the examination regulation.

**Prerequisites**
Successful completion of all relevant modules from the basic program.

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

**Macroeconomic Theory**  
2560404, WS 19/20, 2 SWS, Language: Englisch, Open in study portal  
**Lecture (V)**

**Description**
This course introduces a modern approach to macroeconomics by building on microeconomic principles. To be able to rigorously address key macroeconomic questions a general framework based on intertemporal decision making is introduced. Starting by the principles of consumer and firm behavior, this framework is successively expanded by introducing market imperfections, monetary factors as well as international trade. With this framework at hand students are able to analyze labor market policies, government deficits, monetary policy, financial crises, trade policy, and other important macroeconomic problems. Throughout the course, we not only point out the power of theory but also its limitations.

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

**Literature**
Literature and lecture notes are provided during the course.
7.89 Course: Management and Strategy [T-WIWI-102629]

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

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

**Part of:** M-WIWI-101425 - Strategy and Organization

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### Events

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### Competence Certificate

The assessment consists of a written exam (60 min) taking place at the beginning of the recess period (according to §4 (2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

### Prerequisites

None

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

**Management and Strategy**

2577900, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Lecture (V)**

**Description**

- Corporate management principles
- Strategic management principles
- Strategic analysis
- Competitive strategy: modelling and selection on a divisional level
- Strategies for oligopolies and networks: anticipation of dependencies
- Corporate strategy: modelling and evaluation on a corporate level
- Strategy implementation

**Learning Content**

The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration. Thereby a focus is on imparting knowledge about how price developments in oligopolistic markets can be understood, modeled and forecasted based on game theory.

**Annotation**

The credits for the course "Management and Strategy" have been changed from 4 to 3.5 from summer term 2015 on.

**Workload**

The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**


The relevant excerpts and additional sources are made known during the course.
7.90 Course: Managing Organizations [T-WIWI-102630]

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

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

**Part of:**
- M-WIWI-101425 - Strategy and Organization
- M-WIWI-101513 - Human Resources and Organizations

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<tr>
<td>WS 19/20</td>
<td>Managing Organizations</td>
<td>2 SWS</td>
<td>Lecture (V) Lindstädt</td>
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</table>

**Competence Certificate**
The assessment will consist of a written exam (60 min) taking place at the beginning of the recess period (according to Section 4 (2), 2 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

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

**Managing Organizations**
2577902, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Description**
- Principles of organisational management
- Managing organisational structures and processes: the selection of design parameters
- Ideal-typical organisational structures: choice and effect of parameter combinations
- Managing organisational changes

**Learning Content**
The course should enable the participants to assess the strengths and weaknesses of existing organisational structures and rules using systematic criteria. Here concepts and models for designing organisation structures, regulating organizational processes and managing organisational changes are presented and discussed using case studies. The course is structured to relate to actions and aims to give students a realistic view of the opportunities and limits of rational design approaches.

**Annotation**
The credits for the course "Managing Organizations" have been changed from 4 to 3.5 from summer term 2015 on.

**Workload**
The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**

The relevant excerpts and additional sources are made known during the course.
7 COURSES

Course: Managing the Marketing Mix [T-WIWI-102805]

7.91 Course: Managing the Marketing Mix [T-WIWI-102805]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101424 - Foundations of Marketing

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<td>2571153</td>
<td>Übung zu Marketing Mix (Bachelor)</td>
<td>Ü</td>
<td>1 SWS</td>
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Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation) as well as a case study presentation according to §4(2), 3 SPO 2007/ §4(2), 3 SPO 2015. The grade consists of the grade of the written examination (two thirds) and the grade of the presentation (one third).

Prerequisites
None

Annotation
The course is compulsory in the module "Foundations of Marketing".
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

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

Managing the Marketing Mix
2571152, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

Learning Content
The content of this course concentrates on the elements of the marketing mix. Therefore the main chapters are:

- Brand management
- Pricing
- Promotion

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

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.
7.92 Course: MARS basis lab [T-INFO-102053]

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

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101245 - MARS-Based Internship

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7.93 Course: Mathematics I for Information Systems - Exam [T-MATH-109942]

**Responsible:** Prof. Dr. Andreas Rieder  
Dr. Daniel Weiß  
Prof. Dr. Christian Wieners

**Organisation:** KIT Department of Mathematics

**Part of:**  
M-MATH-104914 - Mathematics I  
M-WIWI-104843 - Orientation Exam

**Type:** Written examination  
**Credits:** 7  
**Version:** 1

**Annotation**
This exam is part of the orientation exam.
### 7.94 Course: Mathematics I for Information Systems - Exercise [T-MATH-109943]

**Responsible:**
- Prof. Dr. Andreas Rieder
- Dr. Daniel Weiss
- Prof. Dr. Christian Wieners

**Organisation:** KIT Department of Mathematics

**Part of:**
- M-MATH-104914 - Mathematics I
- M-WIWI-104843 - Orientation Exam

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**Annotation**
This exam is part of the orientation exam.
7.95 Course: Mathematics II for Information Systems - Exam [T-MATH-109944]

Responsible:  Prof. Dr. Andreas Rieder
              Dr. Daniel Weiß
              Prof. Dr. Christian Wieners

Organisation:  KIT Department of Mathematics

Part of:  M-MATH-104915 - Mathematics II

Type:  Written examination
Credits:  7
Version:  1
### 7.96 Course: Mathematics II for Information Systems - Exercise [T-MATH-109945]

**Responsible:** Prof. Dr. Andreas Rieder  
Dr. Daniel Weiβ  
Prof. Dr. Christian Wieners

**Organisation:** KIT Department of Mathematics  
**Part of:** M-MATH-104915 - Mathematics II

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</table>
Course: Mechanisms and Applications of Workflow Systems [T-INFO-101257]

**Responsible:** Jutta Mülle

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-101235 - Introduction to Data and Information Management

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<td>3 SWS</td>
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Konzepte und Anwendungen von Workflowsystemen
7.98 Course: Mechano-Informatics and Robotics [T-INFO-101294]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-100757 - Mechano-Informatics and Robotics

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

**Mechano-Informatics and Robotics**

**Learning Content**

The lecture addresses various engineering and algorithmic aspects and topics in robotics which are illustrated and explained based on examples originating from current research conducted in the field of humanoid robotics. First, this lecture gives an introduction into the mathematical fundamentals which are needed to describe a robotic system as well as the basic algorithms commonly applied in motion planning. Subsequently, models and methods are introduced with which dynamical systems can be formalized and which can be used to encode and represent robot actions. To do so, we will discuss linear time-invariant systems in state.
7.99 Course: Microprocessors I [T-INFO-101972]

**Responsible:** Prof. Dr. Wolfgang Karl  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101183 - Microprocessors I

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<th>2 SWS</th>
<th>Lecture (V)</th>
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</table>
7 COURSES

7.100 Course: Mobile Computing and Internet of Things [T-INFO-102061]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M/INFO-101249 - Mobile Computing and Internet of Things

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Events

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<td></td>
<td>and Internet of Things</td>
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</table>

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

Notes

Lecture: Tue: 9:45-11:15. Exercise will be Tue 8:00-9:30. FIRST EXERCISE WILL BE ANNOUNCED. NO EXERCISE on Tue Oct, 17.

Literature

Wird in der Vorlesung bekannt gegeben
7.01 Course: Mobile Robots – Practical Course [T-INFO-101992]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101184 - Mobile Robots – Practical Course

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<tr>
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**Events**

| SS 2019 | 24624 | Mobile Robots - Practical Course | 4 SWS | Practical course (P) | Asfour, Kaul, Beil |

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

**Mobile Robots - Practical Course**

24624, SS 2019, 4 SWS, Language: Deutsch, [Open in study portal](#)

**Practical course (P)**

**Learning Content**

In this practical course, students assemble an ASURO robot in groups of two. Each student will be provided with his own robot, which he has to put into operation. While using the robots, a new set of problems will be solved each week. The students will need to prepare for each week given the provided material. Sets of problems be solved using the C language and focus on controlling the robot’s sensors and actuators as well as on the generation of reflex-based behavior. The course ends with a race, where the robots have to tackle an obstacle course.

**Workload**

120 h
Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

**Responsible:** Prof. Dr. Stefan Nickel  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101413 - Applications of Operations Research

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

| SS 2019 | 2550490 | Modellieren und OR-Software: Einführung | 3 SWS | Practical course (P) | Nickel, Bakker |

**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**


**Annotation**

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered in every term. The planned lectures and courses for the next three years are announced online.

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

**Modellieren und OR-Software: Einführung**

2550490, SS 2019, 3 SWS, Language: Deutsch, [Open in study portal]

**Learning Content**

The task of solving combinatorial and nonlinear optimization problems imposes much higher requirements on suggested solution approaches as in linear programming.

During the course of this software laboratory, students get to know important methods from combinatorial optimization, e.g. Branch & Cut- or Column Generation methods and are enabled to solve problems with the software system IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL. In addition, issues of nonlinear optimization, e.g. quadratic optimization, are addressed. As an important part of the software laboratory, students get the possibility to model combinatorial and nonlinear problems and implement solution approaches in the software system.

The software laboratory also introduces some of the most frequently used modelling and programming languages that are used in practice to solve optimization problems.

**Annotation**

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is held 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.
### Course: Nonlinear Optimization I [T-WIWI-102724]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101936 - Methodical Foundations of OR  
- M-WIWI-103278 - Optimization under Uncertainty

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<td>2 SWS</td>
<td>Lecture (V)</td>
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<td>WS 19/20</td>
<td>2550112</td>
<td>Exercises Nonlinear Optimization I + II</td>
<td>SWS</td>
<td>Practice (Ü)</td>
<td>Stein</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:*

#### 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
7.104 Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101936 - Methodical Foundations of OR

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Competence Certificate
The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The exam takes place in the semester of the lecture and in the following semester.

Prerequisites
None.

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
Learning Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Literature
Elective literature:
- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
### Course: Nonlinear Optimization II [T-WIWI-102725]

**Responsible:** Prof. Dr. Oliver Stein  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101936 - Methodical Foundations of OR

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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**

**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
7.106 Course: Operative CRM [T-WIWI-102597]

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

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

**Part of:**
- M-WIWI-101422 - Specialization in Customer Relationship Management
- M-WIWI-101460 - CRM and Service Management

**Type**
- Written examination

**Credits**
- 4.5

**Recurrence**
- Each winter term

**Version**
- 1

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

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

**Prerequisites**
None

**Recommendation**
The attendance of courses Customer Relationship Management and Analytical CRM is advised.

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

**Operative CRM**
2540522, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

**Learning Content**
The Student should be able to understand and implement methods and applications within the operative CRM. This includes, but is not limited to, the analysis of business processes, as a basis for improvements in CRM, and applications like call centers.

**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:
7.107 Course: Optimization under Uncertainty [T-WIWI-106545]

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

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

**Part of:**
- M-WIWI-101413 - Applications of Operations Research
- M-WIWI-103278 - Optimization under Uncertainty

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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.

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101513 - Human Resources and Organizations
        M-WIWI-101668 - Economic Policy I

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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. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date. In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendation
Completion of module Business Administration is recommended. Basic knowledge of microeconomics, game theory, and statistics is recommended.

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

Personnel Policies and Labor Market Institutions
2573001, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

Notes
See Module Handbook
### T 7.109 Course: Platform Economy [T-WIWI-109936]

**Responsible:** Prof. Dr. Christof Weinhardt  
**Organisation:** KIT Department of Economics and Management  
**Part of:**  
- M-WIWI-101421 - Supply Chain Management  
- M-WIWI-101434 - eBusiness and Service Management  

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

**Prerequisites**  
see below

**Recommendation**  
None
### 7.110 Course: Practical Course Computer Engineering: Hardware Design [T-INFO-102011]

**Responsible:** Prof. Dr. Wolfgang Karl  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101219 - Practical Course Computer Engineering: Hardware Design

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7.111 Course: Practical Course Computer Engineering: Hardware Design Übung [T-INFO-105983]

Responsible: Prof. Dr. Wolfgang Karl
Organisation: KIT Department of Informatics
Part of: M-INFO-101219 - Practical Course Computer Engineering: Hardware Design

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### 7.112 Course: Practical Course Web Applications and Service-Oriented Architectures (I) [T-INFO-103119]

**Responsible:** Prof. Dr. Sebastian Abeck  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101633 - Practical Course Web Applications and Service-Oriented Architectures (I)

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Information Systems B.Sc.  
Module Handbook as of 22.08.2019
7.113 Course: Practical Course: Lego Mindstorms [T-INFO-107502]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-102557 - Lego Mindstorms - Practical Course

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**Recommendation**

Basic knowledge in JAVA is necessary for successful completion of this course.

**Learning Content**

In this practical course, teams of three students build and program a mobile robot using Lego Mindstorms and the Java programming language. The robots are challenged to complete a versatile parcours including sections like the traversal of a maze, following a line, crossing a bridge or avoiding obstacle. After initial building of the robots, a section of the parcours will be set up each week and tackled by the robots, for which the students have to prepare their code beforehand. A final race of the robots on the entire parcour will be held at the end of the semester.

**Workload**

120 h
### 7.114 Course: Practical Seminar Digital Services [T-WIWI-105711]

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-102752 - Fundamentals of Digital Service Systems

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**Competence Certificate**
The assessment consists of a seminar paper, a presentation of the results and the contribution to the discussion (according to §4(2), 3 of the examination regulation). The final grade is based on the evaluation of each component (seminar paper, oral presentation, and active participation).

**Prerequisites**
None

**Recommendation**
None

**Annotation**
The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.
7.115 Course: Practical Seminar Interaction [T-WIWI-109935]

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

**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-104911 - Information Systems & Digital Business: Interaction

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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.
T 7.116 Course: Practical Seminar Platforms [T-WIWI-109937]

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

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

**Part of:** M-WIWI-104912 - Information Systems & Digital Business: Platforms

**Type**  
Examination of another type

**Credits**  
4,5

**Recurrence**  
Each term

**Version**  
2

**Competence Certificate**

The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

**Prerequisites**

None.
7.117 Course: Practical Seminar Servitization [T-WIWI-109939]

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

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104913 - Information Systems & Digital Business: Servitization

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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.
7.118 Course: Problem Solving, Communication and Leadership [T-WIWI-102871]

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

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

**Part of:**
- M-WIWI-101425 - Strategy and Organization
- M-WIWI-101513 - Human Resources and Organizations

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**Competence Certificate**
The assessment consists of a written exam (30 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Prerequisites**
None

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

**Problem solving, communication and leadership**

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**Learning Content**
The course deals with various aspects of problem solving and communication processes and is divided into two parts. The first part of the course addresses the fundamental steps in the problem-solving process; namely, problem identification, problem structuring, problem analysis and communication of solution. Ideas for structuring problem solving processes will be discussed and the perquisites for and principles of structured communication based on charts and presentations will be explained. The second part of the course addresses important concepts in leadership, including the context-specificity of influence, the choice of leader and the characteristics of employees. The course content reflects current issues in management and communication practice and is oriented toward the practical application of theoretical insights to these issues. In this respect, the course aims to develop interdisciplinary skills.

**Workload**
The total workload for this course is approximately 60 hours. For further information see German version.

**Literature**
The relevant excerpts and additional sources are made known during the course.
**Course: Process Mining [T-WIWI-109799]**

**Responsible:** Prof. Dr. Andreas Oberweis

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

**Part of:** M-WIWI-101476 - Business Processes and Information Systems

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<td>Exercise Process Mining</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

**Annotation**

Former name (up to winter semester 2018/1019) "Workflow Management".

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

**Process Mining**

2511204, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Learning Content**

The area of process mining covers approaches which aim at deducting new knowledge on the basis of logfiles generated by information systems. Such information systems are e.g., workflow-management-systems which are used for an efficient control of processes in enterprises and organisations. The lecture introduces the foundations of processes and respective modeling and analysis techniques. In the following, the foundations of process mining and the three classical types of approaches - discovery, conformance and enhancement - will be taught. In addition to the theoretical basics, tools, application scenarios in practice and open research questions are covered as well.

**Workload**

Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h
Literature


Further literature is given in the lecture.
7.120 Course: Production Economics and Sustainability [T-WIWI-102820]

**Responsible:** Dr. Jérémy Rimbon
**Organisation:** KIT Department of Economics and Management
**Part of:** M-WIWI-101437 - Industrial Production I

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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.

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

**Production Economics and Sustainability**

2581960, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Lecture (V)**

**Learning Content**

The analysis and management of material flows on the company level and above will be the focus of this lecture. Herein, the discussion will be about cost-effective and environmentally acceptable steps to avoid, abate and recycle emissions and waste as well as ways of efficient resources handling. As methods material flow analysis (MFA), life cycle assessment (LCA) and OR methods, e.g. for decision support, are introduced.

**Topics:**
- regulations related to materials and substances
- raw materials, reserves and their availabilities/lifetimes
- material and substance flow analysis (MFA/SFA)
- material related ecoprofiles, e.g. Carbon Footprint
- LCA
- resource efficiency
- emission abatement
- waste management and closed-loop recycling
- raw material oriented production systems
- environmental management (EMAS, ISO 14001, Ecoprint), eco-controlling

**Workload**

Total effort required will account for approximately 105h (3.5 credits).

**Literature**

will be announced in the course
7.121 Course: Programming [T-INFO-101531]

- **Responsible:** Prof. Dr.-Ing. Anne Koziolek
  - Prof. Dr. Ralf Reussner

- **Organisation:** KIT Department of Informatics

- **Part of:**
  - M-INFO-101174 - Programming
  - M-WIWI-104843 - Orientation Exam

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### 7.122 Course: Programming Pass [T-INFO-101967]

**Responsible:** Prof. Dr.-Ing. Anne Koziolek  
Prof. Dr. Ralf Reussner  

**Organisation:** KIT Department of Informatics  

**Part of:**  
M-INF-101174 - Programming  
M-WIWI-104843 - Orientation Exam

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7.123 Course: Project Management in Practice [T-INFO-101976]

Responsible: Prof. Dr.-Ing. Klemens Böhm
Organisation: KIT Department of Informatics
Part of: M-INFO-101235 - Introduction to Data and Information Management

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Events

SS 2019 | 2400019 | Project Management in Practice | 2 SWS | Lecture (V) | Böhm, Schnober

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

Project Management in Practice
2400019, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

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
7.124 Course: Public Law I & II [T-INFO-110300]

**Responsible:** Prof. Dr. Nikolaus Marsch  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101192 - Constitutional and Administrative Law

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7.125 Course: Public Revenues [T-WIWI-102739]

| Responsible: | Prof. Dr. Berthold Wigger |
| Organisation: | KIT Department of Economics and Management |
| Part of: | M-WIWI-101403 - Public Finance  |
| | M-WIWI-101499 - Applied Microeconomics |
| | M-WIWI-101668 - Economic Policy I |

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**Events**

| SS 2019 | 2560120 | Public Revenues | 2 SWS | Lecture (V) | Wigger |
| SS 2019 | 2560121 | Übung zu Öffentliche Einnahmen | 1 SWS | Practice (Ü) | Wigger |

**Competence Certificate**
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

**Prerequisites**
None

**Recommendation**
Basic knowledge of Public Finance is required.

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

### Public Revenues

2560120, SS 2019, 2 SWS, Language: Deutsch, [Open in study portal](#)

**Description**
The Public Revenues lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

**Learning Content**
The Public Revenues lecture is concerned with the theory and policy of taxation and public dept. In the first chapter, fundamental concepts of taxation theory are introduced, whereas the second chapter deals with key elements of the German taxation system. The allocative and distributive effects of different taxation types are examined in chapter three and four. Chapter five integrates both allocative and distributive components in order to derive a theory of optimal taxation. The core of the sixth chapter is represented by international aspects of taxation. The debt part begins with a description of the extent and structure of public dept in chapter seven. In the following chapter, macroeconomic theories of national dept are evolved, while chapter nine is concerned with its long term consequences when employed as a regular instrument of budgeting. Finally, the tenth chapter deals with constitutional limits to public debt-incurring.

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

Elective literature:

7.126 Course: Public Sector Finance [T-WIWI-109590]

**Responsible:** Prof. Dr. Berthold Wigger  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101403 - Public Finance

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**Events**

| WS 19/20 | 2560136 | 3 SWS | Lecture (V) | Wigger, Groh |

**Competence Certificate**

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO 2015.

**Prerequisites**

T-WIWI-107763 "Municipal Finance" must not be selected.

**Annotation**

Previous title until winter semester 2018/19 "Municipal Finance".

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

**Learning Content**

The course Municipal Finance addresses the theory and policy of municipal revenues and spending including grants, municipal revenue equalisation, taxation as well as municipal and public enterprises.

At the beginning of the course, fundamental concepts of taxation theory as well as key elements of the German taxation system are introduced. The allocative and distributive effects of different taxation methods are examined thereafter and are combined within the theory of optimal taxation. The following chapter is concerned with municipal borrowing and illustrates ways to acquire additional funding. After addressing the extent, structure and variety of municipal borrowing, macroeconomic theories are introduced and applied to the municipal sector. In the course of this final chapter, special attention will be paid to the long term consequences and the sustainability of municipal borrowing as a means of budgeting.

**Literature**

- Several publications of the Ministry of Interior and the Ministry of Finance Baden-Württemberg.
**Course: Python for Empirical Finance [T-WIWI-110217]**

**Responsible:** Prof. Dr Maxim Ulrich  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-105035 - Empirical Finance

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**Type:** Examination of another type  
**Version:** 1

**Competition Certificate**  
The assessment is carried out in form of six biweekly Python programming tasks and offered each winter term. The grade of this course is determined by the points achieved in the programming tasks.

**Prerequisites**  
None.

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

**Python for Empirical Finance**  
2500014, WS 19/20, 2 SWS, Language: Englisch, [Open in study portal]

**Description**  
The aim of this course is to provide students with strong knowledge in Python to independently solve real-world data problems related to computational risk and asset management.

**Learning Content**  
The course covers several topics from a programming perspective, among them:

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

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

7.128 Course: Real Estate Management I [T-WIWI-102744]

- **Responsible:** Prof. Dr.-Ing. Thomas Lützkendorf
- **Organisation:** KIT Department of Economics and Management
- **Part of:** M-WIWI-101466 - Real Estate Management

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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 two times only in the semester in which the lecture is takes place (winter semester). Re-examinations are offered at every ordinary examination date.

**Prerequisites**

None

**Annotation**

The course is replenished by excursions and guest lectures by practitioners out of the real estate business.

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

**Real Estate Management I**

2586400, WS 19/20, 2 SWS, Language: Deutsch, [Open in study portal]

**Description**

The course Real Estate Management I deals with questions concerning the economy of a single building throughout its lifecycle. Among other topics this includes project development, location and market studies, German federal building codes as well as finance and assessment of economic efficiency.

The tutorial recovers the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

**Learning Content**

The course Real Estate Management I deals with questions concerning the economy of a single building throughout its lifecycle. Among other topics this includes project development, location and market studies, German federal building codes as well as finance and assessment of economic efficiency.

The tutorial recovers the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

**Annotation**

The course is replenished by excursions and guest lectures by practitioners out of the real estate business.

**Workload**

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

**Literature**

_Elective literature:_

7.129 Course: Real Estate Management II [T-WIWI-102745]

**Responsible:** Prof. Dr.-Ing. Thomas Lützkendorf

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

**Part of:** M-WIWI-101466 - Real Estate Management

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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 two times only in the semester in which the lecture is takes place (summer semester). Reexaminations are offered at every ordinary examination date.

**Prerequisites**

None

**Recommendation**

A combination with the module Design Construction and Assessment of Green Buildings I is recommended. Furthermore it is recommended to choose courses of the following fields:

- Finance and Banking
- Insurance
- Civil Engineering and Architecture (building physics, structural design, facility management)

**Annotation**

The course is replenished by excursions and guest lectures by practitioners out of the real estate business.

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

**Real Estate Management II**

2585400, SS 2019, 2 SWS, Language: Deutsch, Open in study portal

**Description**

The course Real Estate Management II gives special attention to topics in connection to the management of large real estate portfolios. This especially includes property valuation, market and object rating, maintenance and modernization, as well as real estate portfolio and risk management. The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems.

**Notes**

The course is replenished by excursions and guest lectures by practitioners out of the real estate business.

**Learning Content**

The course Real Estate Management II gives special attention to topics in connection to the management of large real estate portfolios. This especially includes property valuation, market and object rating, maintenance and modernization, as well as real estate portfolio and risk management. The tutorial provides examples in order to practice the application of theoretical knowledge to practical problems.

**Annotation**

The course is replenished by excursions and guest lectures by practitioners out of the real estate business.

**Workload**

The total workload for this course is approximately 135.0 hours. For further information see German version.
Literature
Elective literature:
See german version.
# 7.130 Course: Real-Time Systems [T-INFO-101340]

**Responsible:** Prof. Dr.-Ing. Tamim Asfour  
Prof. Dr.-Ing. Thomas Längle  

**Organisation:** KIT Department of Informatics  

**Part of:** M-INFO-100803 - Real-Time Systems

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- **Type:** Written examination  
- **Credits:** 6  
- **Recurrence:** Each summer term  
- **Version:** 1  

**Events**  
- SS 2019 24576: Real-Time Systems  
  - 4 SWS  
  - Lecture / Practice (VÜ)  
  - Längle, Ledermann
7 COURSES


**Responsible:**
- PD Dr. Patrick Jochem
- Prof. Dr. Russell McKenna

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

**Part of:**
M-WIWI-101464 - Energy Economics

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**Competence Certificate**
The assessment consists of a written exam (60 min., in English, answers in English or German) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO2015.

**Prerequisites**
None.

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

**Renewable Energy – Resources, Technologies and Economics**

2581012, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

**Lecture (V)**

**Learning Content**
1. General introduction: Motivation, Global situation
2. Basics of renewable energies: Energy balance of the earth, potential definition
3. Hydro
4. Wind
5. Solar
6. Biomass
7. Geothermal
8. Other renewable energies
9. Promotion of renewable energies
10. Interactions in systemic context
11. Excursion to the "Energieberg" in Mühlburg

**Workload**
The total workload for this course is approximately 105.0 hours. For further information see German version.

**Literature**

Elective literature:
7.132 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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7 COURSES

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<tr>
<td>Prof. Dr. Dennis Hofheinz</td>
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### 7.134 Course: Selling IT-Solutions Professionally [T-INFO-101977]

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**Responsible:** Prof. Dr.-Ing. Klemens Böhm  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101235 - Introduction to Data and Information Management
7.135 Course: Semantic Web Technologies [T-WIWI-102874]

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

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

**Part of:**
- M-WIWI-101438 - Semantic Knowledge Management
- M-WIWI-101439 - Semantic Web and Applications
- M-WIWI-101440 - Information Services in Networks

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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 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**

**Lecture (V)**

**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


V 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

7.136 Course: Seminar in Applied Informatics (Bachelor) [T-WIWI-102701]

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

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

**Part of:**
- M-WIWI-101438 - Semantic Knowledge Management
- M-WIWI-101439 - Semantic Web and Applications

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</tbody>
</table>

**Competence Certificate**
The assessment is done according to §4(2), 3 of the examination regulation in form of an evaluation of the seminar presentation and a written seminar report. The weighting of the individual marks (presentation and report) is announced at the beginning of the seminar.

**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 http://www.aifb.uni-karlsruhe.de/Lehre

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.

Seminar Service Science, Management & Engineering
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

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.
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<td>Ruckes, Hoang, Benz, Strych, Luedecke, Silbereis, Stengel, Schubert</td>
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<tr>
<td>SS 2019 2530580</td>
<td>Seminar in Finance (Master, Prof. Uhrig-Homburg)</td>
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<td>Seminar (S)</td>
<td>Uhrig-Homburg, Hofmann, Reichenbacher, Eska</td>
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<tr>
<td>SS 2019 2540524</td>
<td>Bachelor Seminar aus CRM (nur Bachelor)</td>
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<td>Geyer-Schulz, Schweigert, Schweizer</td>
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<tr>
<td>SS 2019 2571180</td>
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<td>SS 2019 2573010</td>
<td>Seminar Human Resources and Organizations (Bachelor)</td>
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</tr>
<tr>
<td>SS 2019 2573011</td>
<td>Seminar Human Resource Management (Bachelor)</td>
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<tr>
<td>SS 2019 2579904</td>
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<tr>
<td>SS 2019 2579905</td>
<td>Special Topics in Management Accounting</td>
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<td>SS 2019 2581977</td>
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<tr>
<td>WS 19/20 2530580</td>
<td>Seminar in Finance</td>
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<tr>
<td>WS 19/20 2540524</td>
<td>Bachelor Seminar aus Data Science</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
<td>Geyer-Schulz, Schweigert, Schweizer, Nazemi</td>
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<tr>
<td>WS 19/20 2540557</td>
<td>Literature Review Seminar: Information Systems and Service Design</td>
<td>3 SWS</td>
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<tr>
<td>WS 19/20 2545010</td>
<td>Entrepreneurship Basics (Track 1)</td>
<td>2 SWS</td>
<td>Seminar (S)</td>
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<tr>
<td>WS 19/20 2545011</td>
<td>Entrepreneurship Basics (Track 2)</td>
<td>2 SWS</td>
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<td>Böhrer, Terzidis</td>
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<td>WS 19/20 2573010</td>
<td>Seminar: Human Resources and Organizations (Bachelor)</td>
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<td>WS 19/20 2573011</td>
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<td>Seminar (S)</td>
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<td>WS 19/20 2579919</td>
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<td>WS 19/20 2581976</td>
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<tr>
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<td>Seminar in Production and Operations Management III</td>
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<td>Seminar (S)</td>
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</table>
**Competence Certificate**
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**
None.

**Recommendation**
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

**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.

**Seminar Human Resources and Organizations (Bachelor)**
2573010, SS 2019, 2 SWS, Open in study portal

**Notes**
See Module Handbook

**Seminar Human Resource Management (Bachelor)**
2573011, SS 2019, 2 SWS, Open in study portal

**Notes**
See Module Handbook
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.

Special Topics in Management Accounting
2579905, 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. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

Seminar in Empirical Finance
2500028, WS 19/20, 2 SWS, Language: Englisch, Open in study portal

Description
The aim of this seminar is to introduce the student to empirical data work in financial economics and investments.
**Bachelor Seminar aus Data Science**
2540524, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

**Workload**
The total workload for this course is approximately 90 hours (3 credits):

**Time of attendance**
- Introductory lessons: 4 x 90min = 6h 00m
- Presentations: 4 x 90min = 6h 00m

**Selbststudium**
- Preparing the presentation: 8h
- Literature research: 40h
- Writing the seminar paper: 30h

**Summe:** 90h 00m

**Literature**
**Elective literature:**

**Entrepreneurship Basics (Track 2)**
2545011, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

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

**Seminar: Human Resources and Organizations (Bachelor)**
2573010, WS 19/20, 2 SWS,

**Notes**
See Module Handbook

**Seminar: Human Resource Management (Bachelor)**
2573011, WS 19/20, 2 SWS,

**Notes**
See Module Handbook

**Seminar Management Accounting - Special Topics**
2579919, WS 19/20, 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. Topics are selectively prediscibed. The seminar course is concentrated in four to five meetings that are spread throughout the semester.

**Annotation**
Maximum of 24 students.
**Workload**
The total workload for this course is approximately 90 hours. For further information see German version.

**Literature**
Will be announced in the course.
### 7.138 Course: Seminar in Economics (Bachelor) [T-WIWI-103487]

**Responsible:** Professorenschaft des Fachbereichs Volkswirtschaftslehre  
**Organisation:** KIT Department of Economics and Management  
**Part of:** M-WIWI-101826 - Seminar Module Economic Sciences

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<td>SS 2019</td>
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<td>Seminar ($)</td>
<td>Szech, Maus</td>
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<td>SS 2019</td>
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</table>

**Competence Certificate**  
Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates  
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods  
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**  
None.

**Recommendation**  
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**  
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.  
The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

**Topics in Political Economics (Bachelor)**  
2560553, 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

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.

Topics in Econometrics
2521310, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

Annotation
In the winter semester 2018/19 the course will be held in English.

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.
7 COURSES

Course: Seminar in Informatics (Bachelor) [T-WIWI-103485]

7.139 Course: Seminar in Informatics (Bachelor) [T-WIWI-103485]

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<td>Knowledge Discovery and Data Mining</td>
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<tr>
<td>SS 2019</td>
<td>Seminar Betriebliche Informationssysteme: Datenschutz und IT-Sicherheit (Bachelor)</td>
<td>2 SWS</td>
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<tr>
<td>SS 2019</td>
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<tr>
<td>SS 2019</td>
<td>Emerging Trends in Critical Information Infrastructures</td>
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<tr>
<td>SS 2019</td>
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<td>WS 19/20</td>
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<td>WS 19/20</td>
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<tr>
<td>WS 19/20</td>
<td>Seminar Betriebliche Informationssysteme: Programmieren 3 (Bachelor)</td>
<td>2 SWS</td>
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<tr>
<td>WS 19/20</td>
<td>Cognitive Automobiles and Robots</td>
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<tr>
<td>WS 19/20</td>
<td>Seminar Security, Usability and Society (Bachelor)</td>
<td>2 SWS</td>
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<td>WS 19/20</td>
<td>Seminar Service Science, Management &amp; Engineering</td>
<td>3 SWS</td>
<td>Seminar (S)</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. 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
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.

Seminar Service Science, Management & Engineering
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

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**

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

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**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.

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**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

**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.
7 COURSES

Course: Seminar in Operations Research (Bachelor) [T-WIWI-103488]

7.140 Course: Seminar in Operations Research (Bachelor) [T-WIWI-103488]

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

Organisation:
KIT Department of Economics and Management

Part of:
M-WIWI-101826 - Seminar Module Economic Sciences

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<td>SS 2019 2550132 Seminar zur Mathematischen Optimierung (MA) 2 SWS Seminar (S) Stein, Mohr, Neumann</td>
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<td>SS 2019 2550491 Seminar zur diskreten Optimierung SWS Block (B) Nickel, Mitarbeiter</td>
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<td>WS 19/20 2550491 Seminar: Modern OR and Innovative Logistics 2 SWS Seminar (S) Nickel, Mitarbeiter</td>
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Competence Certificate
Alternative exam certificate (§ 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 in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

Seminar zu Methodischen Grundlagen des Operations Research
2550131, WS 19/20, SWS, Language: Deutsch, Open in study portal

Learning Content
The current seminar topics are announced under http://kop.ior.kit.edu at the end of the preceding semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
References and relevant sources are 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.
**7.141 Course: Seminar in Statistics (Bachelor) [T-WIWI-103489]**

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

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

**Part of:** M-WIWI-101826 - Seminar Module Economic Sciences

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**Events**

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<td>WS 19/20</td>
<td>2521310</td>
<td>Topics in Econometrics</td>
<td>2</td>
<td>Seminar (S)</td>
<td>Schienle, Chen, Görgen</td>
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</table>

**Competence Certificate**

Alternative exam assessment (§ 4(2), 3 SPO 2015). The following aspects are included:

- Regular participation in the seminar dates
- Preparation of a seminar paper on a partial aspect of the seminar topic according to scientific methods
- Lecture on the topic of the seminar paper.

The point scheme for the assessment is determined by the lecturer of the respective course. It will be announced at the beginning of the course.

**Prerequisites**

None.

**Recommendation**

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

**Annotation**

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

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

**Topics in Econometrics**

2521310, WS 19/20, 2 SWS, Language: Deutsch, Open in study portal

**Annotation**

In the winter semester 2018/19 the course will be held in English.
7.142 Course: Seminar Informatics A [T-INFO-104336]

**Responsible:** Prof. Dr. Sebastian Abeck  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-102058 - Seminar Module Informatics

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<td>Advanced Methods of Information Fusion</td>
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<td>Seminar (S)</td>
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<td>WS 19/20</td>
<td>24844</td>
<td>Seminar: Ubiquitous Systems</td>
<td>2</td>
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</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](#)

**Seminar (S)**

**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.
7.143 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

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

Internet und Gesellschaft - gesellschaftliche Werte und technische Umsetzung
2400061, SS 2019, 2 SWS, Open in study portal

Notes
Registration via https://portal.wiwi.kit.edu/ys/2708
7.144 Course: Services Marketing and B2B Marketing [T-WIWI-102806]

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

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

**Part of:** M-WIWI-101424 - Foundations of Marketing

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<td>Klarmann</td>
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<tr>
<td>Services Marketing and B2B Marketing</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
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**Competence Certificate**
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

**Prerequisites**
None

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

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

**Services Marketing and B2B Marketing**

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<td>2 SWS</td>
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<td>Klarmann</td>
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</table>

**Learning Content**
The aim of this course is to prepare students for two certain marketing perspectives. The service marketing is concentrated on the particularities coming up when a company sells services instead of products. Subjects in this section are for example:

- Measuring service quality
- Pricing services
- Management of service staff

The second part of the course contains a business-to-business marketing perspective. Topics are below others:

- Management of buying centers
- Competitive Bidding
- B2B-Branding

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

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

**Literature**
7.145 Course: Software Engineering I [T-INFO-101968]

**Responsible:** Prof. Dr.-Ing. Anne Koziolek  
Prof. Dr. Ralf Reussner  
Prof. Dr. Walter Tichy

**Organisation:** KIT Department of Informatics

**Part of:**  
M-INFO-101175 - Software Engineering I

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<th>4 SWS</th>
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<th>Tichy, Weigelt, Hey</th>
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</table>
7.146 Course: Software Engineering I Pass [T-INFO-101995]

**Responsible:** Prof. Dr. Walter Tichy  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101175 - Software Engineering I

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</table>
7.147 Course: Software Engineering II [T-INFO-101370]

**Responsible:** Prof. Dr.-Ing. Anne Koziolak
Prof. Dr. Ralf Reussner
Prof. Dr. Walter Tichy

**Organisation:** KIT Department of Informatics

**Part of:** M-INFO-100833 - Software Engineering II

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

**Software Engineering II**

**24076, WS 19/20, 4 SWS, Language: Deutsch, [Open in study portal](#)**

**Description**
Students learn methods and techniques for systematic software development. Advanced topics of software engineering are covered.

**Literature**
7 COURSES

Course: Special Topics in Information Systems [T-WIWI-109940]

| Responsible: | Prof. Dr. Christof Weinhardt |
| Organisation: | KIT Department of Economics and Management |
| Part of: | M-WIWI-101434 - eBusiness and Service Management |

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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.
Course: Special Topics of Applied Informatics [T-WIWI-102910]

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

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

**Part of:**
M-WIWI-101476 - Business Processes and Information Systems

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**Competence Certificate**
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation. Depending on the particular course associated with this placeholder a bonus on the examination grade is possible.

**Prerequisites**
None

**Annotation**
This course can be used in particular for the acceptance of external courses whose content is in the broader area of applied informatics, but is not equivalent to another course of this topic.
7 COURSES

Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

7.150 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

Responsible: Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics

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Events

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Competence Certificate

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

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
7.151 Course: Statistics I [T-WIWI-102737]

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

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

**Part of:** M-WIWI-101432 - Introduction to Statistics

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<td>Practice (Ü)</td>
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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 takes place at the end of the lecture period or at the beginning of the recess period. The re-examination takes place in the following semester.

**Prerequisites**

None

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

**Statistics I**

2600008, SS 2019, 4 SWS, Language: Deutsch

Learning Content

A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities
C. Random variables: location and shape parameters, dependency measures, concrete distribution models

**Workload**

150 hours (5.0 Credits).

**Literature**

Skriptum: Kurzfassung Statistik I

**Elective literature:**


### Course: Statistics II [T-WIWI-102738]

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

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

#### Part of:
M-WIWI-101432 - Introduction to Statistics

#### Type
Written examination

#### Credits
5

#### Recurrence
Each winter term

#### Version
1

#### Events

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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 takes place at the end of the lecture period or at the beginning of the recess period. The re-examination takes place in the following semester.

#### Prerequisites
None

#### Recommendation
It is recommended to attend the course Statistics I [2600008] before the course Statistics II [2610020].

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

#### Learning Content
D. Sampling and Estimation Theory: Sampling distributions, estimators, point and interval estimation  
E. Test Theory: General Principles of Hypothesis Testing, Concrete 1- and 2-Sampling Tests  
F. Regression analysis: Simple and multiple linear regression, statistical inference

#### Workload
150 hours (5.0 Credits).

#### Literature
Script: Kurzfassung Statistik II

Elective literature:
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-101423 - Topics in Finance II
         M-WIWI-101465 - Topics in Finance I

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

Prerequisites
None

Recommendation
Attending the lecture "Financial Management" is strongly recommended.
### 7.154 Course: Surfaces for Computer aided Design [T-INFO-102073]

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<tr>
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<th>Prof. Dr. Hartmut Prautzsch</th>
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<td>M-INFO-101254 - Surfaces for Computer Aided Design</td>
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7 COURSES

Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

7.155 Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

- **Responsible:** Prof. Dr. Stefan Nickel
- **Organisation:** KIT Department of Economics and Management
- **Part of:**
  - M-WIWI-101413 - Applications of Operations Research
  - M-WIWI-101421 - Supply Chain Management
  - M-WIWI-103278 - Optimization under Uncertainty

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**Events**

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<td>SS 2019</td>
<td>2550486</td>
<td>Taktisches und operatives SCM</td>
<td>2 SWS</td>
<td>Lecture (V)</td>
<td>Nickel</td>
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<td>SS 2019</td>
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<td>Übungen zu Taktisches und operatives SCM</td>
<td>1 SWS</td>
<td>Practice (Ü)</td>
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**Competence Certificate**

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

**Prerequisite for admission to examination is the succesful completion of the online assessments.**

**Prerequisites**

Prerequisite for admission to examination is the succesful completion of the online assessments.

**Recommendation**

None

**Annotation**

The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

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

**V Taktisches und operatives SCM**

<table>
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<td>Taktisches und operatives SCM</td>
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**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 logistical 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.
Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Literature
Elective Literature

- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
7.156 Course: Team Project Software Development [T-INFO-109823]

**Responsible:**
- Prof. Dr. Sebastian Abeck
- Prof. Dr. Ralf Reussner

**Organisation:**
KIT Department of Informatics

**Part of:**
M-INFO-104809 - Team Project Software Development

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7.157 Course: Technical Conditions Met [T-WIWI-106623]

Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101599 - Statistics and Econometrics

**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
Responsible: Prof. Dr. Martina Zitterbart
Organisation: KIT Department of Informatics
Part of: M-INFO-100801 - Telematics

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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.
**Course: Theoretical Foundations of Computer Science [T-INFO-103235]**

**Responsible:**
- Prof. Dr. Jörn Müller-Quade
- Prof. Dr. Peter Sanders
- Prof. Dr. Dorothea Wagner

**Organisation:**
- KIT Department of Informatics

**Part of:**
- M-INFO-101189 - Theoretical Informatics

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**Events**

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<td>Theoretical Foundations of Computer Science</td>
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<td>Wagner, Brückner, Sauer</td>
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### 7.160 Course: Web Applications and Service-Oriented Architectures (I) [T-INFO-103122]

**Responsible:** Prof. Dr. Sebastian Abeck  
**Organisation:** KIT Department of Informatics  
**Part of:** M-INFO-101636 - Web Applications and Service-Oriented Architectures (I)

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Information Systems B.Sc.  
Module Handbook as of 22.08.2019
7.161 Course: Welfare Economics [T-WIWI-102610]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101501 - Economic Theory

Type: Written examination
Credits: 4.5
Recurrence: Each summer term
Version: 2

Events
| SS 2019 | 2520517 | Welfare Economics | SWS | Lecture (V) | Puppe, Rollmann |
| SS 2019 | 2520518 | Übung zur Wohlfahrtstheorie | SWS | Practice (Ü) | Puppe, Rollmann |

Competence Certificate
The assessment consists of a written exam at the end of the semester (according to Section 4 (2), 1 or 2 of the examination regulation).

Prerequisites
The courses Economics I: Microeconomics [2610012] and Economics II: Macroeconomics [2600014] have to be completed beforehand.

Recommendation
None

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

V Welfare Economics 2520517, SS 2019, SWS, Language: Deutsch, Open in study portal Lecture (V)

Learning Content
The lecture "Welfare economics" deals with the question of efficiency and distributional properties of economic allocations, in particular allocations of market equilibria. The lecture is based on the two welfare theorems: The first welfare theorem (under weak preconditions) says that every competitive equilibrium is efficient. According to the second welfare theorem (under stronger preconditions), every efficient allocation can be preserved as a competitive equilibrium through adequate choices of initial endowments. Afterwards, the terms and definitions of envy-freeness and the related concept of egalitarian equivalence in the context of the general theory of equilibrium will be discussed. The second part of the lecture deals with the principle of "social justice" (i.e. distributational justice). The fundamental principles of utilitarianism, Rawl’s theory of justice as well as John Roemer’s theory of equality of opportunity are explained and critically analyzed.

Annotation
The course will be held every two years in the summer.

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

Literature
Elective literature:
7 COURSES

Course: Wildcard eBusiness and Service Management [T-WIWI-109808]

7.162 Course: Wildcard eBusiness and Service Management [T-WIWI-109808]

Organisation: University
Part of: M-WIWI-101434 - eBusiness and Service Management

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7.163 Course: Wildcard Supply Chain Management [T-WIWI-109802]

Organisation: University
Part of: M-WIWI-101421 - Supply Chain Management

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