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5.1 **Basic program**
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5.2 **Specialisation program**
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### 6 Operations Research

6.1 **Basic program**
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6.2 **Specialisation program**
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7.1 **Basic program**
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*Industrial Engineering and Management (B.Sc.)*

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- Energy Economics - M-WIWI-101464
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- Engineering Mechanics - WI1ING3
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- Algorithms for Internet Applications - T-WIWI-102658
- Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines - T-MACH-105173
- Analysis of multivariate Data - T-WIWI-103063
- Analysis Tools for Combustion Diagnostics - T-MACH-105167
- Analytical CRM - T-WIWI-102596
- Applied Informatics I - Modelling - T-WIWI-102652
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Part I

Important notes

The status of the following overview is 08/01/2016. Interim changes to modules and exams are announced at http://www.wiwi.kit.edu/lehreMHB.php.

New modules

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Part II
Structure of the Bachelor’s degree program in Industrial Engineering and Management SPO 2015

The Bachelor’s degree program in Industrial Engineering and Management entails a six-semester standard study period. The basic program in the first three semesters is systematically structured. In the fourth to fifth semesters, a more advanced, specialization program that can be structured depending on one’s personal interests and goals is offered. The following figure 1 shows the course and module structure with the respective credit points as well as an example of a possible distribution of modules and courses in the basic program over the semesters, which has proven to be useful.

![Course and Module Structure](https://portal.wiwi.kit.edu/Seminare)

In the basic program (blue), the business administration, economics, informatics, operations research, engineering sciences, statistics and mathematics modules are compulsory. In the 3rd semester, one can choose between Material Transformation and Balances, Engineering Mechanics and Material Science in the engineering basic module. In the specialization program (green), a module must be selected from each of the following areas: business administration, economics, informatics, operations research and engineering. As part of the mandatory courses, one seminar module (independent of the course) and two modules must be completed. One module can be selected from business administration or engineering subjects and the other from business administration, economics, informatics, operations research, engineering, statistics, law or sociology.

The internship can be completed before or during the Bachelor’s program. The performance record of the completed internship is required for registration for the final module examination in the course.

One is free to structure his/her individual course plan as he/she wishes (taking into account the respective provisions of the study and examination regulations as well as applicable module regulations) and choose the semester he/she wishes to start and/or complete the selected modules. It is however strongly recommended to adhere to the proposal for the first three semesters. The content of the courses is interdisciplinary and coordinated accordingly; the intersection freedom of lectures and examination dates is guaranteed for the recommended study semester.

All modules of the basic and advanced program, including the various alternatives within the module, can be found in this module handbook. Seminars that can be taken up as part of the seminar module are published at the WiWi portal at [https://portal.wiwi.kit.edu/Seminare](https://portal.wiwi.kit.edu/Seminare).
Part III

Structure of the Bachelor’s degree program in Industrial Engineering and Management SPO 2007

The structure of the Bachelor’s degree program in Industrial Engineering and Management (B.Sc.) slightly differs from the structure following SPO 2015. Offered modules and courses are quite similar and equal the presentation in this module handbook. Nevertheless, there are minor specificities, summarized in illustration 2.

The differing modules of the Bachelor’s degree program in Industrial Engineering and Management SPO 2007 are listed in chapter VII. Illustration 3 shows the structure of fields and modules and their correlated credit points following SPO 2007.

The Study- and Examination Regulation SPO 2007 is part of the appendix.
<table>
<thead>
<tr>
<th>SPO 2007</th>
<th>SPO 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Terms</strong></td>
<td><strong>Terms</strong></td>
</tr>
<tr>
<td>The structure of the Bachelor’s degree course in Industrial Engineering and Management is subdivided into a Core Program and Specialization Program.</td>
<td>The structure of the Bachelor’s degree course in Industrial Engineering and Management is subdivided into a Basic Program and Specialization Program.</td>
</tr>
<tr>
<td>The exams are split into written exams, oral exams and non exam assessments.</td>
<td>The 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.</td>
</tr>
<tr>
<td><strong>Key skills</strong></td>
<td><strong>Key skills</strong></td>
</tr>
<tr>
<td>Besides the integrated key skills, the additive acquisition of key skills within the seminar module is an inherent element of the program. Students may choose freely among the offered courses of HoC and ZAK.</td>
<td>An additive acquisition of key skills is not an inherent element of the program.</td>
</tr>
<tr>
<td><strong>Seminar module</strong></td>
<td><strong>Seminar module</strong></td>
</tr>
<tr>
<td>Students have to attend two seminars with a minimum of 6 CP (Credit Points) within the seminar module. Furthermore one has to acquire additional key skills of at least 3 credits.</td>
<td>The seminar module is part of the Electives within the Specialization Program. Students have to attend one seminar with a minimum of 3 CP. An acquisition of additional key skills is not required.</td>
</tr>
<tr>
<td><strong>Internship</strong></td>
<td><strong>Internship</strong></td>
</tr>
<tr>
<td>The internship has an amount of 8 CP.</td>
<td>The internship has an amount of 10 CP.</td>
</tr>
<tr>
<td><strong>Modules of the Core- and Basic Program</strong></td>
<td><strong>Modules of the Core- and Basic Program</strong></td>
</tr>
<tr>
<td>Within the Core Program the module “Business Administration” (15 CP) is scheduled.</td>
<td>The module “Business Administration” has been divided into two modules: “Fundamentals of Business Administration 1” and “Fundamentals of Business Administration 2”.</td>
</tr>
<tr>
<td>Within the Core Program the module “Mathematics” (21 CP) is scheduled.</td>
<td>The module “Mathematics” has been divided into three modules: “Mathematics 1”, “Mathematics 2” and “Mathematics 3”.</td>
</tr>
<tr>
<td>Within the Core Program the module “Introduction to Informatics” (15 CP) is scheduled.</td>
<td>The module “Introduction to Informatics” has been divided into two modules: “Introduction to Programming” and “Foundations of Informatics”.</td>
</tr>
<tr>
<td>Within the Core Program the modules “Economics” (10 CP) and “Statistics” (10 Credits) are scheduled.</td>
<td>The modules “Economics” and “Statistics” have been renamed to “Introduction to Economics” and “Introduction to Statistics”.</td>
</tr>
<tr>
<td>Within the Core Program the four modules of Engineering Sciences “Mass and Energy Balances for Reacting Systems”, “Materials Science”, “Engineering Mechanics” and “Electrical Engineering” (all of them with an amount of 2,5 CP) are scheduled.</td>
<td>Within the Basic Program the four modules of Engineering Sciences “Materials Science”, “Engineering Mechanics”, “Electrical Engineering” and “Additional Fundamentals of Engineering” (all of them with an amount of 3 CP) are scheduled. The course “Mass and Energy Balances for Reacting Systems” is now part of the (new) module “Additional Fundamentals of Engineering”.</td>
</tr>
</tbody>
</table>

Figure 2: Differences between SPO 2007 and SPO 2015
### Industrial Engineering and Management (B.Sc.)

#### Core Programme

<table>
<thead>
<tr>
<th>Semester</th>
<th>Subject</th>
<th>BA</th>
<th>EC</th>
<th>INFO</th>
<th>OR</th>
<th>ENG</th>
<th>MATH</th>
<th>STAT</th>
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<tr>
<td>1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BA FA</td>
<td>4 CP</td>
<td>EC 1</td>
<td>Progr</td>
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</tr>
<tr>
<td></td>
<td>BA SMIEM</td>
<td>3 CP</td>
<td>5 CP</td>
<td>5 CP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BA PEM</td>
<td>4 CP</td>
<td>EC 2</td>
<td>Info 1</td>
<td>OR 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 CP</td>
<td>5 CP</td>
<td>5 CP</td>
<td>4,5 CP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acc</td>
<td>4 CP</td>
<td>Info 2</td>
<td>OR 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 CP</td>
<td>5 CP</td>
<td>4,5 CP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

**Internship 8 CP**

#### Specialization Programme

<table>
<thead>
<tr>
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<th>Elective</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>BA, EC, INFO, OR, ING, Seminar + KS</td>
<td>BA/ENG, Elective</td>
</tr>
<tr>
<td>5</td>
<td>9 CP, 9 CP, 9 CP, 9 CP, 6 + 3 CP</td>
<td>9 CP, 9 CP</td>
</tr>
<tr>
<td>6</td>
<td>Bachelor Thesis 12 CP</td>
<td></td>
</tr>
</tbody>
</table>

**182 CP**

(Core Programme + Specialization Programme + Bachelorarbeit)

---

Figure 3: Structure of the Bachelor’s degree program in Industrial Engineering and Management SPO 2007 (recommended)
Part IV

Key Skills

The Bachelor’s degree course in Industrial Engineering and Management at the Department of Economics and Management distinguishes itself by an exceptionally high level of interdisciplinarity. With the combination of business science, economics, informatics, operations research, mathematics as well as engineering and natural science, the integration of knowledge of different disciplines is an inherent element of the programme. As a result, interdisciplinary and connected thinking is encouraged in a natural way. Furthermore, tutor programs with more than 20 semester periods per week contribute significantly to the development of key skills in the bachelor programme. The integrative taught key skills, which are acquired throughout the entire programme, can be classified into the following fields:

**Soft skills**
1. Team work, social communication and creativity techniques
2. Presentations and presentation techniques
3. Logical and systematical arguing and writing
4. Structured problem solving and communication

**Enabling skills**
1. Decision making in business context
2. Project management competences
3. Fundamentals of business science
4. English as a foreign language

**Orientational knowledge**
1. Acquisition of interdisciplinary knowledge
2. Institutional knowledge about economic and legal systems
3. Knowledge about international organisations
4. Media, technology and innovation

The integrative acquisition of key skills especially takes place in several compulsory courses during the bachelor programme, namely
1. Basic programme in economics and business science
2. Seminar module
3. Mentoring of the bachelor thesis
4. Internship
5. Business science, economics and informatics modules

In **SPO 2007**, besides the integrated key skills, the additive acquisition of key skills, which are totalling at least three credits within the seminar module, is scheduled. Students may choose freely among the offered courses of HoC, ZAK and Sprachenzentrum.
Part V
Module Handbook - a helpful guide throughout the studies

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

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

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

Begin and completion of a module

Every module and every course is allowed to be credited only once. The decision whether the course is assigned to one module or the other (e.g. if a course is selectable in two or more modules) is made by the student at the time of signing in for the corresponding exam. The module is succeeded, if the general exam of the module and/or if all of its relevant partial exams have been passed (grade min 4.0). In order to that the minimum requirement of credits of this module have been met.

General exams and partial exams

The module exam can be taken in a general exam or several partial exams. If the module exam is offered as a general exam, the entire content of the module will be reviewed in a single exam. If the module exam exists of partial exams, the content of each course will be reviewed in corresponding partial exams. The registration for the examinations takes place online via the self-service function for students. The following functions can be accessed on https://campus.studium.kit.edu/exams/index.php:

- Sign in and sign off exams
- Retrieve examination results
- Print transcript of records

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

Types of exams

Following SPO 2015 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. According to SPO 2007 exams are split into written exams, oral exams and non exam assessments. Non exam assessments are graded or not.
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 losing the examination claim. A counseling interview is mandatory.

For further information see [http://www.wiwi.kit.edu/hinweiseZweitwdh.php](http://www.wiwi.kit.edu/hinweiseZweitwdh.php).

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.

Further information

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

Used abbreviations

<table>
<thead>
<tr>
<th>LP/CP</th>
<th>Credit Points/ECTS</th>
<th>Leistungspunkte/ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV</td>
<td>course</td>
<td>Lehrveranstaltung</td>
</tr>
<tr>
<td>RÜ</td>
<td>computing lab</td>
<td>Rechnerübung</td>
</tr>
<tr>
<td>S</td>
<td>summer term</td>
<td>Sommersemester</td>
</tr>
<tr>
<td>Sem.</td>
<td>semester/term</td>
<td>Semester</td>
</tr>
<tr>
<td>ER/SPO</td>
<td>examination regulations</td>
<td>Studien- und Prüfungsordnung</td>
</tr>
<tr>
<td>KS/SQ</td>
<td>key skills</td>
<td>Schlüsselqualifikationen</td>
</tr>
<tr>
<td>SWS</td>
<td>contact hour</td>
<td>Semesterwochenstunde</td>
</tr>
<tr>
<td>Ü</td>
<td>excercise course</td>
<td>Übung</td>
</tr>
<tr>
<td>V</td>
<td>lecture</td>
<td>Vorlesung</td>
</tr>
<tr>
<td>W</td>
<td>winter term</td>
<td>Wintersemester</td>
</tr>
</tbody>
</table>
Part VI

Modules

1 Bachelor Thesis

Module: Module Bachelor Thesis [M-WIWI-101601]

Responsibility: Martin Ruckes
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Bachelor Thesis

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Deutsch</td>
</tr>
</tbody>
</table>

Learning Control / Examinations

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

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

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

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

The overall grade of the module is the grade of the Bachelor Thesis.

Conditions

Prerequisite for admission to the Bachelor thesis is that the student is usually in the 3rd Academic year (5th and 6th semester) and has at most one of the exams of the basic program not been completed.

It is recommended to begin the Bachelor Thesis in the 5th or 6th Semester.

A written confirmation of the examiner about supervising the Bachelor’s Thesis is required.

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

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

Qualification Objectives

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.
1 BACHELOR THESIS

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

Workload
The total workload for this module is approximately 360 hours. For further information see German version.
## 2 Internship

### Module: Internship [M-WIWI-101419]

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Martin Ruckes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation</td>
<td>KIT-Fakultät für Wirtschaftswissenschaften</td>
</tr>
<tr>
<td>Curricular Anchorage</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Contained in</td>
<td>Internship</td>
</tr>
</tbody>
</table>

**ECTS** 10  
**Recurrence** Once

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102611</td>
<td>Internship (S. 491)</td>
<td>10</td>
<td>Martin Ruckes</td>
</tr>
</tbody>
</table>

### Learning Control / Examinations

The assessment is carried out by the evidence of completed full-time internships of at least 12 weeks with at least 20 working hours per week and a presentation of the internship in the form of a written report on the activities.

1. **Information on evidence of completed full-time internships:**

   The internship is proofed by the certificate of the intern’s office. The certificate has to be formally correct with official corporate letterhead and handwritten countersigned by a responsible employee of the company.

   The certificate must at least contain the following information:

   * Company / Location
   * Duration: from ... to ...
   * Hours of work (weekly)
   * Working interruption, indicating the vacation and sick days
   * Department
   * Headwords to the activities

2. **Information on to the presentation:**

   The internship report should be at least one page (typewritten, not handwritten) for each Location. It must be countersigned by a representative of the intern’s office.

### Conditions

None

### Qualification Objectives

- has general insight into the essential processes in a company,
- is in a position to identify operation correlations and has the knowledge and skills to facilitate a fast understanding of the processes in the company,
- in addition to practical professional experience and competences, also has key competences such as own initiative, ability to work in a team and communication skills as well as ability to integrate into corporate hierarchies and procedures,
has the experience to accomplish complex IT and business tasks under realistic conditions within the framework of the relevant legal aspects and while applying the total acquired knowledge (interlaced thinking),
• has an idea of the professional development potential in the economy through pursuit of study-related activities,
• knows the technical and professional requirements in the individually targeted future occupation and can take this knowledge into account for the future planning of his/her studies and career,
• can assess and estimate own technical and professional strengths and weaknesses through his/her evaluation of the company.

Content
The internship may be done in economic, business and/or technical companies. At best, it is done on activities which are located at the intersection of the two fields - getting to know the specific requirements of Industrial Engineering and Management. A commercial internship provides an insight into business or administrative processes of business transactions. Therefor departments such as controlling, organizing, marketing and planning appear particularly suitable.
Work experiences in the departments of engineering, work preparation and provision of material or IT cover more technical aspects of the internship. But work experiences in an engineering firm go with a technical internship.
It remains the companies and interns left, which stations and areas the intern will eventually go through. But the focus should always be in accordance with operational realities of the company.

Remarks
Internships, that were completed even before studying may be recognized, if the criteria for recognition are met. After recognition of the compulsory internship, there can be taken a semester off for a voluntary, student-related internship. The possibility is particularly interesting in view of the master programme, which requires internships of at least 12 weeks.
Regarding to the election of the company, in which the internship is completed, there are no specific rules. With a view to the future professional career, it is recommended to absolve the internship in a larger, possibly international company.
Vacation days are not figured into the internship.
Only three sick leave days may incurred at all. Any additional sick days are not figured into the internship.
A relevant vocational education of at least two years is accepted as a performance equivalent to the internship.

Workload
The total workload for this module is approximately 300 hours.
3 Business Administration

3.1 Basic program

Module: Fundamentals of Business Administration 1 [M-WIWI-101494]

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Business Administration/Basic program

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>7</td>
<td>Each term</td>
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Compulsory

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<tr>
<td>T-WIWI-102817</td>
<td>Business Administration: Strategic Management and Information Engineering and Management (S. 395)</td>
<td>3</td>
<td>Petra Nieken, Martin Ruckes</td>
</tr>
<tr>
<td>T-WIWI-102819</td>
<td>Business Administration: Finance and Accounting (S. 393)</td>
<td>4</td>
<td>Marliese Uhrig-Homburg, Martin Ruckes</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the individual courses of this module. The examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedure of each course of this module is defined for each course 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.

Conditions
None

Qualification Objectives
The student
- has core skills in business administration in particular with respect to decision making and the model based view of business corporations
- masters the fundamentals of business and information management as well as the fundamentals business finance and the principles of business accounting
- is able to analyze and assess central tasks, functions and decisions in modern corporations

The knowledge of the two fundamentals modules in business administration forms the basis for the successful completion of advanced courses in the field of business administration and management.

Content
This module provides the fundamentals of business administration and management. Further, the module focuses on the fields of management and organization, information engineering and management, investment and financing as well as of the principles of management and financial accounting.

Recommendations
It is strongly recommended to take the courses in the first semester of study.

Workload
The total workload of the module is about 210 hours. The workload is proportional to the credit points of the individual courses.
Module: Fundamentals of Business Administration 2 [M-WIWI-101578]

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Business Administration/Basic program

<table>
<thead>
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<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102818</td>
<td>Business Administration: Production Economics and Marketing (S. 394)</td>
<td>4</td>
<td>Martin Klarmann, Thomas Lützkendorf, Wolf Fichtner, Frank Schultmann, Martin Ruckes</td>
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<tr>
<td>T-WIWI-102816</td>
<td>Financial Accounting and Cost Accounting (S. 447)</td>
<td>4</td>
<td>Jan-Oliver Strych</td>
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</table>

Learning Control / Examinations
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. The examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedures of each course of this module is defined for each course 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.

Conditions
None

Qualification Objectives
The student
- has core skills in business administration in particular with respect to decision making and the model based view of business corporations
- masters the fundamentals of production and operations management and marketing as well as the fundamentals of management and financial accounting
- is able to analyze and assess central tasks, functions and decisions in modern corporations

The knowledge of the two fundamentals modules in business administration forms the basis for the successful completion of advanced courses in the field of business administration and management.

Recommendations
It is strongly recommended to take the courses in the second semester (Betriebswirtschaftslehre: Produktionswirtschaft und Marketing) and third semester (Rechnungswesen) of study.

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

**Module: CRM and Service Management [M-WIWI-101460]**

**Responsibility:** Andreas Geyer-Schulz

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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</table>

**Wahlpflichtangebot**

Non-Compulsory Block; min. 2, max. 2 Courses

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course Description</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
</tr>
<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
</tr>
<tr>
<td>T-WIWI-102595</td>
<td>Customer Relationship Management (S. 411)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
</tr>
</tbody>
</table>

**Learning Control / Examinations**

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. Therby every lecture is examined by a written exam (according to Section 4(2), 1 of the examination regulation) and by successful completion of exercises (according to Section 4 (2), 3 of the examination regulation).

The grades of the individual lectures consists of the grade of the written exam (approximately 90 percent resp. 100 of 112 points) and of the exercise performance (approximately 10 percent resp. 12 of 112 points). In the case of passing the written exam (50 points) the points of the exercise performance will be added to the points of the written exam. 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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

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, ...).
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, …).

Remarks
The lecture Customer Relationship Management [2540508] is given in English. The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM is offered for a last time in the summer term 14. Details on the cycle and on the exams can be found on http://www.em.uni-karlsruhe.de/studies/.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Design, Construction and Sustainability Assessment of Buildings [M-WIWI-101467]

Responsibility: Thomas Lützkendorf

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration

Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
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<tr>
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Compulsory

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<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102742</td>
<td>Design, Construction and Sustainability Assessment of Buildings I (S. 418)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
</tr>
<tr>
<td>T-WIWI-102743</td>
<td>Design, Construction and Sustainability Assessment of Buildings II (S. 419)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:


Qualification Objectives

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.

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.

Recommendations

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.
Module: eBusiness and Service Management [M-WIWI-101434]

Responsibility: Christof Weinhardt
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
           Compulsory Elective Modules/Elective Module 1/Business Administration
           Compulsory Elective Modules/Elective Module 2/Business Administration
           Additional Examinations

Identifiers Course ECTS Responsibility
T-WIWI-105771 Foundations of Digital Services A (S. 452) 4,5 Christof Weinhardt, Gerhard Satzger
T-WIWI-102598 Management of Business Networks (S. 516) 4,5 Christof Weinhardt
T-WIWI-102600 eFinance: Information Engineering and Management for Securities Trading (S. 427) 4,5 Christof Weinhardt
T-WIWI-102706 Special Topics in Information Engineering & Management (S. 623) 4,5 Christof Weinhardt

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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 “Management of Business Networks”, “eFinance: Information engineering and management in finance” and “eServices” constitute three different application domains in which the basic principles of the Internet Economy are deepened. In the course
"Management of Business Networks" the focus is set on the strategic aspects of management and information systems. It is held in English and teaches parts of the syllabus with the support of a case study elaborated with Lecturers from Concordia University, Montreal, or if applicable, Rotterdam School of Management. Thus the matter of strategic enterprise networks, a.k.a. smart business networks is also analysed by employing an international perspective.

The course "eFinance: information engineering and management 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 services.

The theoretic fundamentals of Information Engineering and Management 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 Engineering and Management.

Remarks
All practical Seminars offered at the IM can be chosen for Special Topics in Information Engineering & Management. Please update yourself on www.iism.kit.edu/im/lehre
Module: eFinance [M-WIWI-101402]

Responsibility: Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

**ECTS** | **Recurrence** | **Duration** | **Level**
---|---|---|---
9 | Each term | 2 semester | 3

### Compulsory

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
</tr>
</tbody>
</table>

### Ergänzungsangebot
Non-Compulsory Block; min. 4,5, max. 4,5 ECTS

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<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
<td>1,5</td>
<td>Jörg Franke</td>
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</table>

### Learning Control / Examinations
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.

### Conditions
Successful passing of the corresponding modules of the basic program.

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

### Modeled Conditions
The following conditions must be met:


### Qualification Objectives
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.

### 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.

Remarks
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
Module: Energy Economics [M-WIWI-101464]

Responsibility: Wolf Fichtner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration

Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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<th>Identifier</th>
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<th>ECTS</th>
<th>Responsibility</th>
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</thead>
<tbody>
<tr>
<td>T-WIWI-102746</td>
<td>Introduction to Energy Economics (S. 493)</td>
<td>5,5</td>
<td>Wolf Fichtner</td>
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Ergänzungsangebot

Non-Compulsory Block; min. 3,5, max. 3,5 ECTS

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<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-100806</td>
<td>Renewable Energy-Resources, Technologies and Economics (S. 593)</td>
<td>3,5</td>
<td>Russell McKenna</td>
</tr>
<tr>
<td>T-WIWI-102607</td>
<td>Energy Policy (S. 436)</td>
<td>3,5</td>
<td>Martin Wietschel</td>
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</table>

Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.

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

Modeled Conditions

The following conditions must be met:


Qualification Objectives

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.

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.)
Corporate Governance in Energy Economics: Challenges of the management of a large company in energy economics (superior leadership role, structures, processes and projects from a leadership perspective etc.)

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

Recommendations
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.

Remarks
Upon request, the authorisation for taking the examinations for modules of specialisation can be granted by the examination committee even if the mentioned conditions are not fulfilled. The approving statement of the coordinator of the module of specialisation claimed on the application form is not required for the module Energy Economics [TVWLIP2]. The application form has to be submitted to the examination committee of the faculty along with a current transcript of records (e.g. via letterbox). Upon request at the institute, additional recognition of studies (e.g. from other universities) is possible in the module.

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

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<th>Identifier</th>
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<th>ECTS</th>
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<tbody>
<tr>
<td>T-WIWI-102604</td>
<td>Investments (S. 504)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-102605</td>
<td>Financial Management (S. 450)</td>
<td>4,5</td>
<td>Martin Ruckes</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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.
### Module: Foundations of Marketing [M-WIWI-101424]

**Responsibility:** Martin Klarmann  
**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Business Administration/Specialisation program  
**Curricular Anchorage:** Compulsory Elective Modules/Elective Module 1/Business Administration  
**Curricular Anchorage:** Compulsory Elective Modules/Elective Module 2/Business Administration  

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<tbody>
<tr>
<td>T-WIWI-102805</td>
<td>Managing the Marketing Mix (S. 521)</td>
<td>4,5</td>
<td>Martin Klarmann</td>
</tr>
</tbody>
</table>

#### Compulsory

**Identifier**  
**Course**  
**ECTS**  
**Responsibility**

T-WIWI-102798  
Brand Management (S. 390)  
4,5  
Bruno Neibecker

T-WIWI-102806  
Services Marketing and B2B Marketing (S. 612)  
3  
Martin Klarmann, Ju-Young Kim

T-WIWI-102807  
International Marketing (S. 490)  
1,5  
Martin Klarmann

### Learning Control / Examinations

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.

### Conditions

Successful passing of the corresponding modules of the basic program.  
The course *Marketing Mix* is compulsory and must be examined.

### Modeled Conditions

The following conditions must be met:


### Qualification Objectives

Ziel dieses Moduls ist es, Studierende auf eine Tätigkeit in Marketing oder Vertrieb vorzubereiten. Gerade in technisch orientierten Unternehmen werden hierfür gerne Mitarbeiter eingesetzt, die als Wirtschaftsingenieure oder Informationswirte auch selbst einen gewissen technischen Hintergrund haben.

Studierende

- kennen die wichtigsten Konzepte, Verfahren und Theorien der vier Instrumente des Marketing Mix (Produktmanagement, Preismanagement, Kommunikationsmanagement und Vertriebsmanagement)
- verfügen über das Wissen, Entscheidungen bezüglich der gegenwärtigen und zukünftigen Produkte (Produktinnovationen) zu treffen (z.B. mittels Conjoint-Analyse)
- wissen, wie Kunden Marken wahrnehmen und wie diese Wahrnehmung durch das Unternehmen beeinflusst werden kann
### 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 module in two ways:

- by choosing the course “Brand Management”.
- by choosing the combination of the courses “Services- and B2B-Marketing” and “International Marketing”.

### Remarks

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.

Responsibility: Christof Weinhardt, Gerhard Satzger

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program
               Compulsory Elective Modules/Elective Module 1/Business Administration
               Compulsory Elective Modules/Elective Module 2/Business Administration
               Additional Examinations

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<tbody>
<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4.5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
</tr>
<tr>
<td>T-WIWI-105775</td>
<td>Foundations of Digital Services B (S. 454)</td>
<td>4.5</td>
<td>Stefan Nickel, Stefan Morana, Alexander Mädche</td>
</tr>
<tr>
<td>T-WIWI-105711</td>
<td>Practical Seminar Digital Services (S. 563)</td>
<td>4.5</td>
<td>Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Alexander Mädche, York Sure-Vetter, Gerhard Satzger</td>
</tr>
</tbody>
</table>

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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

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 pushes the 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.

Recommendations
None

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


Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Human Resources and Organizations [M-WIWI-101513]

Responsibility: Petra Nieken
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>T-WIWI-102909</td>
<td>Human Resource Management (S. 477)</td>
<td>4,5</td>
<td>Petra Nieken</td>
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**Ergänzungsangebot**

Non-Compulsory Block; min. 4,5, max. 5,5 ECTS

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<tr>
<td>T-WIWI-102908</td>
<td>Personnel Policies and Labor Market Institutions (S. 553)</td>
<td>4,5</td>
<td>Petra Nieken</td>
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<tr>
<td>T-WIWI-102630</td>
<td>Managing Organizations (S. 520)</td>
<td>3,5</td>
<td>Hagen Lindstädt</td>
</tr>
<tr>
<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
<td>2</td>
<td>Hagen Lindstädt</td>
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</table>

**Learning Control / Examinations**

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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

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

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

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.

**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.

**Recommendations**
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.
Module: Industrial Production I [M-WIWI-101437]

Responsibility: Frank Schultmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

<table>
<thead>
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<th>ECTS</th>
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<th>Duration</th>
<th>Level</th>
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<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>2 semester</td>
<td>3</td>
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Compulsory

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<tr>
<td>T-WIWI-102606</td>
<td>Fundamentals of Production Management (S. 466)</td>
<td>5,5</td>
<td>Frank Schultmann</td>
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Ergänzungsangebot
Non-Compulsory Block; min. 3,5, max. 3,5 ECTS

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<tr>
<td>T-WIWI-102820</td>
<td>Production Economics and Sustainability (S. 578)</td>
<td>3,5</td>
<td>Magnus Fröhling</td>
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<tr>
<td>T-WIWI-102870</td>
<td>Logistics and Supply Chain Management (S. 510)</td>
<td>3,5</td>
<td>Marcus Wiens</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

The course “Fundamentals of Production Management” [2581950] and one additional activity have to be chosen.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
- 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.

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: Machine Learning for Finance and Data Science [M-WIWI-102753]**

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

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<tr>
<td>T-WIWI-105712</td>
<td>Probabilistic Machine Learning for Finance and Data Science (S. 570)</td>
<td>4,5</td>
<td>Maxim Ulrich</td>
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<tr>
<td>T-WIWI-105714</td>
<td>Solving Finance Problems using Machine Learning (S. 621)</td>
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<td>Maxim Ulrich</td>
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**Learning Control / Examinations**

The assessment is carried out as a module wide exam which itself consists of several partial exams (according to Section 4 (2), 1-3 SPO). A written exam at the end of the semester (120 min) (§4(2), 1 SPO) accounts for 50% of the module-wide grade. Students who have failed the first exam are allowed to retake the exam (during the 4th lecture free week in the same summer term). Another 25% of the module grade is accounted for by the submission of weekly programming problem sets (during the first half of the semester). The presentation and submission of a machine learning programming project (during the 2nd half of the semester) accounts for the final 25% of the module-wide grade. Interested students can in addition earn a “Seminarschein”.

**Conditions**

A formal prerequisite for taking this module is that students successfully complete all partial exams of the module wide exam within the same semester (only). Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

We put students into the shoes of a chief risk manager of a global quant asset management firm. Students first learn the most essential finance concepts such as Markowitz approach to portfolio management, the Capital Asset Pricing Model to determine cost of capital (and expected asset returns) of investments, linear factor models to predict expected returns and systematic and unsystematic risk of investments. After completion of this first couple of learning points, students learn modern machine learning tools to accomplish superior predictions for future returns and risks of different asset classes (such as equity, fixed-income, derivatives).

Upon completion of the module, students will have a conceptual, analytical and practical working knowledge of the following concepts and implemented these using Python:

1. **Financial Concepts**
   - A.1 Portfolio Management
     - Markowitz
     - Black-Litterman
   - A.2 Predicting an asset’s expected return
     - CAPM, Fama-French, linear factor models
     - Fama-MacBeth
     - ARMA modeling
- State Space modeling
  A.3 Predicting an asset’s future risk
- ARCH/GARCH
- State Space modeling

1. Machine Learning concepts

B.1 ‘Supervised learning’ within linear and nonlinear models (e.g. least squares, maximum likelihood, Kalman Filter, MCMC)
B.2 ‘Unsupervised learning’ (e.g. PCA, SVD)

Content
This module provides a hands-on introduction to the use of machine learning for modeling financial markets. We will cover methods on how to predict asset returns, how to estimate the risk density of returns and respective risk premiums and how to build optimal portfolios. We will make use of modern statistical machine learning algorithms and test them rigorously with risk and asset management applications. The intuitive, yet analytical combination of machine learning on the one hand and financial applications on the other hand are a key feature of this module. The revealed knowledge will be useful for quantitative industry internships and jobs as well as for quantitative and/or data driven lectures, seminars and bachelor thesis at the FBV or other KIT institutes. In addition to studying the machine learning concepts, students receive numerous opportunities use modern machine learning software in order to solve current financial problems.

Recommendations
This module is self-contained. It is recommended that students have already heard other finance courses, although this is not a formal prerequisite. Students are assumed to have earned at least good grades during the KIT Bachelor’s math, stats, OR and IT courses.

Remarks
The courses of the module are held in English.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Management Accounting [M-WIWI-101498]

Responsibility: Marcus Wouters
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<td>T-WIWI-102800</td>
<td>Management Accounting 1 (S. 513)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
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<tr>
<td>T-WIWI-102801</td>
<td>Management Accounting 2 (S. 514)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
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Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

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

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

Remarks
Students who like this module are probably also interested in the courses
• 2530216 Financial Management
• 2530210 Management Accounting

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

Responsibility: Thomas Lützkendorf

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory

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<tr>
<td>T-WIWI-102744</td>
<td>Real Estate Management I (S. 590)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
</tr>
<tr>
<td>T-WIWI-102745</td>
<td>Real Estate Management II (S. 591)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:


Qualification Objectives

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.

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.

Recommendations

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.
Module: Risk and Insurance Management [M-WIWI-101436]

Responsibility: Ute Werner
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tr>
<td>9</td>
<td>Each term</td>
<td>2 semester</td>
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Compulsory

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<tbody>
<tr>
<td>T-WIWI-102603</td>
<td>Principles of Insurance Management (S. 569)</td>
<td>4,5</td>
<td>Ute Werner</td>
</tr>
<tr>
<td>T-WIWI-102608</td>
<td>Enterprise Risk Management (S. 439)</td>
<td>4,5</td>
<td>Ute Werner</td>
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Learning Control / Examinations
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 lectures are examined by oral presentations and related term papers in the context of the lectures. Furthermore, there is a final oral examination.

The grade of each examination consists of the oral presentation and the term paper (50 percent) and the oral examination (50 percent). 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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
See German version.

Content
See German version.
Module: Specialization in Customer Relationship Management [M-WIWI-101422]

Responsibility: Andreas Geyer-Schulz

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

Wahlpflichtangebot
Non-Compulsory Block; min. 1, max. 2 Courses

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<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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Ergänzungsangebot
Non-Compulsory Block; max. 1 Courses

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<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4,5</td>
<td>Kay Mitusch</td>
</tr>
<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
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Learning Control / Examinations
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, 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.

Conditions
Successful passing of the corresponding modules of the basic program.

- 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.
- At least, one of the courses Analytic CRM [2540522] and Operative CRM [2540520] has to be taken.

Modeled Conditions
The following conditions must be met:

1. Module [M-WIWI-101460] CRM and Service Management has to be started before taking this module.
2. Successful completion of module [M-WIWI-101494] Fundamentals of Business Administration 1 is required before taking this module.

Qualification Objectives
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.

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 (Extraction /
Translation / Loading). The process of modelling a data-warehouse as well as the so-called extraction, translation, 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, ...)

Remarks
The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM
is offered for a last time in the summer term 14. Details on

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Strategy and Organization [M-WIWI-101425]

Responsibility: Hagen Lindstädt
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<tr>
<td>T-WIWI-102629</td>
<td>Management and Strategy (S. 515)</td>
<td>3.5</td>
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<tr>
<td>T-WIWI-102630</td>
<td>Managing Organizations (S. 520)</td>
<td>3.5</td>
<td>Each term</td>
<td>2 semester</td>
<td>3</td>
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<tr>
<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
<td>2</td>
<td>Each term</td>
<td>2 semester</td>
<td>3</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
See German version.

Content

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Supply Chain Management [M-WIWI-101421]

Responsibility: Stefan Nickel
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

ECTS: 9
Recurrence: Each term
Duration: 1 semester
Level: 3

Wahlpflichtangebot
Non-Compulsory Block; min. 1, max. 2 Courses

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<tr>
<td>T-WIWI-102598</td>
<td>Management of Business Networks (S. 516)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-102760</td>
<td>Management of Business Networks (Introduction) (S. 517)</td>
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<td>Christof Weinhardt</td>
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Ergänzungsangebot
Non-Compulsory Block; max. 4 Courses

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<tr>
<td>T-WIWI-103061</td>
<td>Prerequisite for Facility Location and Strategic Supply Chain Management (S. 565)</td>
<td></td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
<td>4,5</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-MACH-102089</td>
<td>Logistics - Organisation, Design and Control of Logistic Systems (S. 508)</td>
<td>6</td>
<td>Kai Furmans</td>
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</table>

Learning Control / Examinations
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.

Conditions
At least one of the courses Management of Business Networks [2590452] and Management of Business Networks (Introduction) [2540496] has to be taken. Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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

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 “Management of Business Networks” the focus is set on the strategic aspects of management and information systems. The course is held in English and teaches parts of the syllabus with the support of a case study elaborated with Prof Kersten from Concordia University, Montreal, Canada. The course MBN introduction is consisting out of the first part of the regular MBN lecture, but as it has less credits will not include the analysis of the case study. The module is completed by an elective course addressing appropriate optimization methods for the Supply Chain Management and for modern logistic approaches.

Remarks
The planned lectures in the next terms can be found on the websites of the respective institutes IISM, IFL and IOR.
Module: Topics in Finance I [M-WIWI-101465]

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration

Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<th>Responsibility</th>
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<tr>
<td>T-WIWI-102623</td>
<td>Financial Intermediation (S. 449)</td>
<td>4,5</td>
<td>Martin Ruckes</td>
</tr>
<tr>
<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
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<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
<td>1,5</td>
<td>Jörg Franke</td>
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<tr>
<td>T-WIWI-102626</td>
<td>Business Strategies of Banks (S. 397)</td>
<td>3</td>
<td>Wolfgang Müller</td>
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<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
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<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<td>T-WIWI-102790</td>
<td>Specific Aspects in Taxation (S. 629)</td>
<td>4,5</td>
<td>Armin Bader, Berthold Wigger</td>
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<tr>
<td>T-WIWI-102879</td>
<td>Asset Management (S. 376)</td>
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<td>Andreas Sauer</td>
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Learning Control / Examinations

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 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.

Conditions

Successful passing of the corresponding modules of the basic program.

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.

Modeled Conditions

The following conditions must be met:

3. Module [M-WIWI-101435] Essentials of Finance has to be started before taking this module.

Qualification Objectives

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

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.
Recommendations

None
### Module: Topics in Finance II [M-WIWI-101423]

**Responsibility:** Marliese Uhrig-Homburg, Martin Ruckes

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration/Specialisation program

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<td>Armin Bader, Berthold Wigger</td>
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<tr>
<td>T-WIWI-102879</td>
<td>Asset Management (S. 376)</td>
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<td>Andreas Sauer</td>
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**Wahlpflichtangebot**

Non-Compulsory Block; min. 9, max. 9 ECTS

**Learning Control / Examinations**

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 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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

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.

**Modeled Conditions**

The following conditions must be met:

3. Module [M-WIWI-101435] Essentials of Finance has to be started before taking this module.

**Qualification Objectives**

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

**Remarks**

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

4.1 Basic program

Module: Introduction to Economics [M-WIWI-101398]

Responsibility: Clemens Puppe
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Economics/Basic program

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<tr>
<td>T-WIWI-102708</td>
<td>Economics I: Microeconomics (S. 422)</td>
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<tr>
<td>T-WIWI-102709</td>
<td>Economics II: Macroeconomics (S. 424)</td>
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Learning Control / Examinations
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. The assessment procedures of each course of this module is defined for each course separately.

Module Grade
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.

Qualification Objectives
The student
- knows and understands basic economic problems,
- understands economic policy in globalized markets,
- is able to develop elementary solution concepts.

The lectures of this module have different focuses: In Economics I, economic problems are seen as decision problems, Economics II treats the dynamics of economic processes.

Content
The basic concepts, methods and models of micro- and macroeconomics are treated. The course Economics I: Microeconomics [2600012] deals with micro-economic decision theory, questions of market theory and problems of imperfect competition and with basic principles of game theory and welfare economics. Economics II: Macroeconomics [2600014] discusses economic organization models and national accounts as well as the question of international trade and monetary policy. Furthermore, the complex growth, boom and economic speculations are dealt with.

Remarks
Notice: The lecture Economics I: Microeconomics [2600012] is part of the preliminary examination concerning § 8(1) of the examination regulation. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Workload
See German version.
4.2 Specialisation program

Module: Applied Microeconomics [M-WIWI-101499]

Responsibility: Johannes Philipp Reiß
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics
Additional Examinations

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<th>Language</th>
<th>Level</th>
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<td>Each term</td>
<td>1 Semester</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<tr>
<td>T-WIWI-102850</td>
<td>Introduction to Game Theory (S. 496)</td>
<td>4,5</td>
<td>Clemens Puppe, Johannes Philipp Reiß</td>
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<tr>
<td>T-WIWI-102844</td>
<td>Industrial Organization (S. 483)</td>
<td>4,5</td>
<td>Johannes Philipp Reiß</td>
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<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4,5</td>
<td>Kay Mitusch</td>
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<tr>
<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
<td>4,5</td>
<td>Berthold Wigger</td>
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<tr>
<td>T-WIWI-102876</td>
<td>Auction &amp; Mechanism Design (S. 377)</td>
<td>4,5</td>
<td>Nora Szech</td>
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<tr>
<td>T-WIWI-102892</td>
<td>Economics and Behavior (S. 421)</td>
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<td>T-WIWI-102792</td>
<td>Decision Theory (S. 415)</td>
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<td>Karl-Martin Ehrhart</td>
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<td>T-WIWI-102736</td>
<td>Economics III: Introduction in Econometrics (S. 425)</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
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").

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.

Recommendations
Completion of the module Economics is assumed.
Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Economic Policy I [M-WIWI-101668]

Responsibility: Ingrid Ott
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics
Additional Examinations

**ECTS**

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<td>1 Semester</td>
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**Wahlpflichtangebot**
Non-Compulsory Block; min. 9, max. 9 ECTS

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<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
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<td>Kay Mitusch</td>
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<tr>
<td>T-WIWI-103213</td>
<td>Basic Principles of Economic Policy (S. 384)</td>
<td>4,5</td>
<td>Ingrid Ott</td>
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<tr>
<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
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<td>Berthold Wigger</td>
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**Learning Control / Examinations**
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.

**Conditions**
Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**
The following conditions must be met:
- Successful completion of module [M-WIWI-101398] *Introduction to Economics* is required before taking this module.

**Qualification Objectives**
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 legitimisation from the perspective of economic welfare
- learn how theory-based policy recommendations are derived

**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

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

**Remarks**

**Workload**
Total expenditure of time for 9 credits: 270 hours.
Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

The exact distribution is subject to the credits of the courses of the module.
Module: Economic Theory [M-WIWI-101501]

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics
Additional Examinations

ECTS | Recurrence | Duration | Level |
--- | --- | --- | --- |
9 | Each term | 2 semester | 3 |

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<td>Welfare Economics (S. 649)</td>
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<td>Clemens Puppe</td>
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<td>Industrial Organization (S. 483)</td>
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<td>Johannes Philipp Reiß</td>
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<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory (S. 366)</td>
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<td>T-WIWI-102876</td>
<td>Auction &amp; Mechanism Design (S. 377)</td>
<td>4,5</td>
<td>Nora Szech</td>
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Learning Control / Examinations
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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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

• Successful completion of module [M-WIWI-101398] Introduction to Economics is required before taking this module.

Qualification Objectives
See German version.

Recommendations
None
Module: Public Finance [M-WIWI-101403]

Responsibility: Berthold Wigger
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics

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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<td>Specific Aspects in Taxation (S. 629)</td>
<td>4,5</td>
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<td>Monetary and Financial Policy (S. 542)</td>
<td>4,5</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101398] Introduction to Economics is required before taking this module.

Qualification Objectives
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.

Recommendations
It is recommended to attend the course Spezielle Steuerlehre [2560129] after having completed the course Öffentliche Einnahmen [2560120].

Remarks
See German version.

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

5.1 Basic program

**Module: Foundations of Informatics [M-WIWI-101417]**

<table>
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**Responsibility:** Hartmut Schmeck, York Sure-Vetter

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory

**Contained in:** Informatics/Basic program

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<td>T-WIWI-102707</td>
<td>Foundations of Informatics II (S. 456)</td>
<td>5</td>
<td>Hartmut Schmeck</td>
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</table>

**Learning Control / Examinations**

The assessment is carried out as partial exams (according to Section 4(2), 1 and 3 of the examination regulation) of the individual courses of this module.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. For a successful module assessment both partial exams have to be passed.

- **Foundations of Informatics I:** Written exam in the first week of the recess period (60 min)
- **Foundations of Informatics II:** Written exam in the first week of the recess period (90 min). It is possible to gain 0.3-0.4 additional grading points for a passed exam by successful completion of a bonus exam.

When both partial exams are passed, the overall grade of the module is the average of the grades for each course weighted by the credit points and truncated after the first decimal.

**Conditions**

None

**Qualification Objectives**

The student

- knows the main principles, methods and systems of computer science,
- can use this knowledge for applications in advanced computer science courses and other areas for situation-adequate problem solving,
- is capable of finding strategic and creative responses in the search for solutions to well defined, concrete, and abstract problems.

The student can deepen the learned concepts, methods, and systems of computer science in advanced computer science lectures.

**Content**

This module conveys knowledge about modeling, logic, algorithms, sorting and searching algorithms, complexity theory, problem specifications, and data structures. From the field of theoretical computer science, formal models of automata, languages and algorithms are presented and applied to the architecture of computer systems.

**Recommendations**

It is strongly recommended to attend the courses of the core program in the following sequence: Introduction to Programming with Java, Foundations of Informatics I, Foundations of Informatics II

**Workload**

The total workload for this module is approximately 300 hours.
Module: Introduction to Programming [M-WIWI-101581]

Responsibility: Johann Marius Zöllner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory

Contained in: Informatics/Basic program

<table>
<thead>
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<th>Language</th>
<th>Level</th>
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<tr>
<td>5</td>
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### Compulsory

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<th>ECTS</th>
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<tbody>
<tr>
<td>T-WIWI-102735</td>
<td>Introduction to Programming with Java (S. 502)</td>
<td>5</td>
<td>Johann Marius Zöllner, N.N.</td>
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</table>

#### Learning Control / Examinations

The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation. The successful completion of the compulsory tests in the computer lab is prerequisite for admission to the written resp. computer-based exam. The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

#### Conditions

None

#### Qualification Objectives

see german version

#### Content

see german version

#### Workload

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

Module: Emphasis Informatics [M-WIWI-101399]

Responsibility: Rudi Studer, Hartmut Schmeck, Andreas Oberweis

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Informatics/Specialisation program

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Wahlpflichtangebot

Non-Compulsory Block; min. 5, max. 5 ECTS

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<tr>
<td>T-WIWI-102747</td>
<td>Advanced Programming - Java Network Programming (S. 365)</td>
<td>5</td>
<td>Dietmar Ratz</td>
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<tr>
<td>T-WIWI-102748</td>
<td>Advanced Programming - Application of Business Software (S. 363)</td>
<td>5</td>
<td>Stefan Klink, Andreas Oberweis</td>
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Ergänzungsangebot

Non-Compulsory Block; min. 4, max. 5 ECTS

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<tr>
<td>T-WIWI-102651</td>
<td>Applied Informatics II - IT Systems for eCommerce (S. 375)</td>
<td>5</td>
<td>Johann Marius Zöllner</td>
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<tr>
<td>T-WIWI-102652</td>
<td>Applied Informatics I - Modelling (S. 374)</td>
<td>5</td>
<td>Andreas Oberweis, York Sure-Vetter</td>
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<tr>
<td>T-WIWI-102910</td>
<td>Special Topics of Applied Informatics (S. 624)</td>
<td>5</td>
<td>Rudi Studer, Hartmut Schmeck,</td>
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<td></td>
<td></td>
<td></td>
<td>Andreas Oberweis</td>
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<tr>
<td>T-WIWI-102658</td>
<td>Algorithms for Internet Applications (S. 368)</td>
<td>5</td>
<td>Hartmut Schmeck</td>
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<td>T-WIWI-102664</td>
<td>Knowledge Management (S. 506)</td>
<td>4</td>
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<tr>
<td>T-WIWI-100809</td>
<td>Software Engineering (S. 618)</td>
<td>4</td>
<td>Andreas Oberweis</td>
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<tr>
<td>T-WIWI-102655</td>
<td>Efficient Algorithms (S. 426)</td>
<td>5</td>
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<tr>
<td>T-WIWI-102660</td>
<td>Database Systems (S. 413)</td>
<td>5</td>
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<td>T-WIWI-104679</td>
<td>Foundations of mobile Business (S. 457)</td>
<td>5</td>
<td>Andreas Oberweis, Gunther Schiefer</td>
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</table>

Learning Control / Examinations

The assessment is carried out as two partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module. For passing the module exam in every single partial exam the respective minimum requirements has to be achieved.

- Partial exam I: Advanced Programming - Java Network Programming or alternatively Advanced Programming - Application of Business Software
- Partial exam II: all the rest

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

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

Please note the following information about the module component exams of Prof. Dr. H. Schmeck:
- Algorithms for Internet Applications [T-WIWI-102658]: The examination will be offered latest until summer term 2017 (repeaters only).
- Effiziente Algorithmen [T-WIWI-102655]: The examination will be offered latest until winter term 2016/2017 (repeaters only).

Conditions

None
Qualification Objectives
The student

- has the capability of dealing with the practical application of the Java programming language (which is the dominating programming language in many application areas) or alternatively the ability to configure, parameterize and deploy enterprise software to enable, support and automate business processes,
- is familiar with methods and systems of a core topic or core application area of computer science,
- can choose these methods and system situation adequately and can furthermore design and employ them for problem solving,
- is able to independently find strategic and creative answers in the finding of solutions to well defined, concrete, and abstract problems.

Content
In this module, object-oriented programming skills using the Java programming language are further deepened. Alternatively important fundamentals of business information systems are conveyed that enable, support and accelerate new forms of business processes and organizational forms. Based on a core application area, basic methods and techniques of computer science are presented.

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

6.1 Basic program

Module: Introduction to Operations Research [M-WIWI-101418]

Responsibility: Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Operations Research/Basic program

<table>
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Compulsory

Identifier Course ECTS Responsibility
T-WIWI-102758 Introduction to Operations Research I and II (S. 501) 9 Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel

Learning Control / Examinations
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.

Module Grade
The overall grade of the module is the grade of the written examination.

Conditions
None

Qualification Objectives
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.

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.
6.2 Specialisation program

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

<table>
<thead>
<tr>
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<tr>
<td>T-WIWI-103061</td>
<td>Prerequisite for Facility Location and Strategic Supply Chain Management (S. 565)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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</table>

**Wahlpflichtangebot**

Non-Compulsory Block; min. 1, max. 4 Courses

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<th>ECTS</th>
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<tr>
<td>T-WIWI-102717</td>
<td>Software Laboratory: OR Models I (S. 619)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102726</td>
<td>Global Optimization I (S. 470)</td>
<td>4,5</td>
<td>Oliver Stein</td>
</tr>
<tr>
<td>T-WIWI-102627</td>
<td>Simulation I (S. 613)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
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</table>

**Ergänzungsangebot**

Non-Compulsory Block; max. 1 Courses

Learning Control / Examinations

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.

Conditions

At least one of the courses Facility Location and strategic Supply Chain Management [2550486] and Tactical and operational Supply Chain Management [2550488] has to be taken.

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:

- Successful completion of module [M-WIWI-101418] Introduction to Operations Research is required before taking this module.

Qualification Objectives

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.

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.

Remarks
The planned lectures and courses for the next three years are announced online.
Module: Methodical Foundations of OR [M-WIWI-101414]

Responsibility: Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Research/Specialisation program

Compulsory Elective Modules/Elective Module 2/Operations Research

Additional Examinations

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<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
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</table>

Wahlpflichtangebot
Non-Compulsory Block; min. 1, max. 3 Courses

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<th>Identifier Course</th>
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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102726 Global Optimization I (S. 470)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-103062 Prerequisite for Nonlinear Optimization I (Bachelor) (S. 566)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-102724 Nonlinear Optimization I (S. 545)</td>
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<td>Oliver Stein</td>
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Ergänzungsangebot
Non-Compulsory Block; max. 1 Courses

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<tr>
<td>T-WIWI-102727 Global Optimization II (S. 472)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-103638 Global Optimization I and II (S. 471)</td>
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<td>Oliver Stein</td>
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<td>T-WIWI-103060 Prerequisite for Nonlinear Optimization II (Bachelor) (S. 567)</td>
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<td>T-WIWI-102725 Nonlinear Optimization II (S. 547)</td>
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<td>Oliver Stein</td>
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<td>T-WIWI-103637 Nonlinear Optimization I und II (S. 546)</td>
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<td>T-WIWI-103061 Prerequisite for Facility Location and Strategic Supply Chain Management (S. 565)</td>
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<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102704 Facility Location and Strategic Supply Chain Management (S. 443)</td>
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<tr>
<td>T-WIWI-102710 Markov Decision Models I (S. 523)</td>
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<td>Karl-Heinz Waldmann</td>
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Learning Control / Examinations

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.

Conditions
At least one of the lectures Nonlinear Optimization I [2550111] and Global Optimization I [2550134] has to be examined. Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101418] Introduction to Operations Research is required before taking this module.

Qualification Objectives
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.

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.

Remarks
The planned lectures and courses for the next three years are announced online (http://www.ior.kit.edu).
For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Stochastic Methods and Simulation [M-WIWI-101400]

Responsibility: Karl-Heinz Waldmann
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Operations Research/Specialisation program
Compulsory Elective Modules/Elective Module 2/Operations Research

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<td>Each term</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 1, max. 2 Courses

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<td>Markov Decision Models I (S. 523)</td>
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<tr>
<td>T-WIWI-102627</td>
<td>Simulation I (S. 613)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
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Ergänzungsangebot
Non-Compulsory Block; max. 2 Courses

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<td>T-WIWI-102711</td>
<td>Markov Decision Models II (S. 524)</td>
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<td>T-WIWI-102703</td>
<td>Simulation II (S. 614)</td>
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<td>Karl-Heinz Waldmann</td>
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<td>T-WIWI-103062</td>
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<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
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<td>T-WIWI-102724</td>
<td>Nonlinear Optimization I (S. 545)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<td>Stefan Nickel</td>
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<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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Learning Control / Examinations
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.

Conditions
At least one of the courses Markov Decision Models [2550679] or Simulation I [2550662] has to be attended.
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101418] Introduction to Operations Research is required before taking this module.

Qualification Objectives
The student possesses profound knowledge in modelling, analyzing and optimizing stochastic systems in economy and engineering.

Content
Markov Decision Models I: Markov Chains, Poisson Processes
Markov Decision Models II: Queueing Systems, Stochastic Decision Processes
Simulation I: Generation of random numbers, Monte Carlo integration, Discrete event simulation, Discrete and continuous random variables, Statistical analysis of simulated data.
Simulation II: Variance reduction techniques, Simulation of stochastic processes, Case studies.
Remarks
The planned lectures and courses for the next two years are announced online (http://www.ior.kit.edu/).
Module: Additional Fundamentals of Engineering [M-WIWI-101839]

Responsibility: Michael Hoffmann, Alexander Fidlin, Peter Pfeifer
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Engineering Sciences/Basic program

<table>
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<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
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<td>Deutsch</td>
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<td>T-MACH-102210</td>
<td>Introduction to Engineering Mechanics II : Dynamics (S. 495)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<td>T-CIWVT-106058</td>
<td>Process fundamentals by the example of food production (S. 574)</td>
<td>3</td>
<td>Volker Gaukel</td>
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</table>

Learning Control / Examinations
See course description.

Qualification Objectives
See German version.

Remarks
The course “Mass and Energy Balances for Reacting Systems” will not be offered any more from winter term 2015/2016 on. The examination will be offered latest until summer term 2016 (repeaters only).

Workload
The total workload for this module is approximately 90 hours.
Module: Electrical Engineering [M-ETIT-101155]

Responsibility: Wolfgang Menesklou
Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik
Curricular Anchorage: Compulsory
Contained in: Engineering Sciences/Basic program

ECTS | Recurrence | Duration | Level |
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3 | Each winter term | 1 semester | 1 |

Compulsory

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<td>Electrical Engineering for Business Engineers, Part I (S. 430)</td>
<td>3</td>
<td>Wolfgang Menesklou</td>
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</table>

Learning Control / Examinations

The assessment of the module is carried out by a written examination about the lecture Electrical Engineering I [23223] (according to Section 4(2), 1 of the examination regulation).
The grade of the module corresponds to the grade of this examination.

Qualification Objectives

The student knows and understands basic terms of electrical engineering and should be able to carry out simple calculations of DC and AC circuits.

Content

Supporting the lecture, assignments to the curriculum are distributed. These are solved into additional (voluntary) tutorials.

Workload

See German version.

Responsibility: Alexander Fidlin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory
Contained in: Engineering Sciences/Basic program

ECTS
Recurrence Duration Language Level
3 Each winter term 1 semester Deutsch 1

Compulsory

<table>
<thead>
<tr>
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<th>ECTS</th>
<th>Responsibility</th>
</tr>
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<tbody>
<tr>
<td>T-MACH-102208</td>
<td>Introduction to Engineering Mechanics I: Statics and Strength of Materials (S. 494)</td>
<td>3</td>
<td>Alexander Fidlin</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment consists of a written examination taking place in the recess period (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. Permitted utilities: non-programmable calculator, literature

Conditions
None

Qualification Objectives
The student
- knows and understands the basic elements of statics,
- is able to solve basic problems in statics indipendently.

Content
Statics: force • moment • general equilibrium conditions • center of gravity • inner forces in structure • plane frameworks • adhesion

Remarks
Starting summer 2016 the course "Introduction to Engineering Mechanics I : Statics and Strength of Materials" [2162238] will be held in summer term.

Workload
The total workload for this module is approximately 90 hours.
Module: Materials Science [M-MACH-101260]

Responsibility: Michael Hoffmann

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory

Contained in: Engineering Sciences/Basic program

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<tr>
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Compulsory

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<tbody>
<tr>
<td>T-MACH-102078</td>
<td>Materials Science I (S. 528)</td>
<td>3</td>
<td>Michael Hoffmann</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment of the module is carried out by a written examination (150 min) about the lecture Material Science I [2125760] (according to Section 4(2), 1 of the examination regulation).
The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.
The grade of the module corresponds to the grade of this examination.

Conditions
None.

Qualification Objectives
Students are able to specify the basics of materials science and engineering and can apply it to simple problems in various technical areas.

As major part of the module, the students know the correlation between atomic structure and bonding of solids and the macroscopic properties such as mechanical behavior or electrical conductivity. They have basic knowledge with respect to materials characterization. The students are able to analyze phase diagrams with up to two components and can derive simple correlations among composition, processing, microstructure evolution and materials properties.

Content
After an introduction to the atomic structure and interatomic bonding, elementary concepts of crystallography are given. Different types of crystal structures are explained and various types of imperfections in solids. Then, the mechanical behaviour and the physical properties of various types of materials (metals, polymers, ceramics) are discussed. The thermodynamic principles of solidification and the basic types of phase diagrams are given to understand to iron-carbon phase diagram and the manifold microstructures of steel and cast iron.

Workload
The total workload for this module is approximately 90 hours.
7.2 Specialisation program

Module: Automotive Engineering [M-MACH-101266]

Responsibility: Frank Gauterin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tbody>
<tr>
<td>T-MACH-100092</td>
<td>Automotive Engineering (S. 379)</td>
<td>6</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
</tr>
<tr>
<td>T-MACH-102117</td>
<td>Automotive Engineering II (S. 381)</td>
<td>3</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
</tr>
<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4.5</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
</tr>
<tr>
<td>T-MACH-102116</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies I (S. 459)</td>
<td>1.5</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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<tr>
<td>T-MACH-102119</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies II (S. 460)</td>
<td>1.5</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems (S. 451)</td>
<td>5</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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<tr>
<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
</tr>
<tr>
<td>T-MACH-102203</td>
<td>Automotive Engineering I (S. 380)</td>
<td>6</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] Materials Science is required before taking this module.

Qualification Objectives
The student
- knows the most important components of a vehicle,
- knows and understands the functioning and the interaction of the individual components,
- knows the basics of dimensioning the components.
Content
See course descriptions.

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

Workload
See German version.
Module: Combustion Engines I [M-MACH-101275]

Responsibility: Heiko Kubach

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Identification

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-102194</td>
<td>Combustion Engines I (S. 400)</td>
<td>5</td>
<td>Thomas Koch, Heiko Kubach</td>
</tr>
<tr>
<td>T-MACH-105564</td>
<td>Energy Conversion and Increased Efficiency in Internal Combustion Engines (S. 434)</td>
<td>4</td>
<td>Thomas Koch, Heiko Kubach</td>
</tr>
</tbody>
</table>

Conditions

Successful passing of the corresponding modules of the basic program.

Qualification Objectives

The student can name and explain the working principle of combustion engines. He is able to analyse and evaluate the combustion process. He is able to evaluate influences of gas exchange, mixture formation, fuels and exhaust gas aftertreatment on the combustion performance. He can solve basic research problems in the field of engine development.

The student can name all important influences on the combustion process. He can analyse and evaluate the engine process considering efficiency, emissions and potential.

Content

Introduction, History, Concepts
Working Principle and Thermodynamics
Characteristic Parameters
Air Path
Fuel Path
Energy Conversion
Fuels
Emissions
Exhaust Gas Aftertreatment
Reaction kinetics
Gas exchange
Ignition
Flow field of gasoline engines
Working process
Pressure trace analysis
Thermodynamic analysis of the high pressure process
Exergy analysis and waste heat recuperation
Aspects of sustainability
Module: Combustion Engines II [M-MACH-101303]

Responsibility: Heiko Kubach

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

Compulsory

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<th>Identifier</th>
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<tbody>
<tr>
<td>T-MACH-104609</td>
<td>Combustion Engines II (S. 401)</td>
<td>5</td>
<td>Heiko Kubach</td>
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Verbrennungsmotoren II
Non-Compulsory Block; min. 4 ECTS

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<tr>
<td>T-MACH-105044</td>
<td>Fundamentals of Catalytic Exhaust Gas Aftertreatment (S. 465)</td>
<td>4</td>
<td>Egbert Lox</td>
</tr>
<tr>
<td>T-MACH-105173</td>
<td>Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines (S. 370)</td>
<td>4</td>
<td>Marcus Gohl</td>
</tr>
<tr>
<td>T-MACH-105184</td>
<td>Fuels and Lubricants for Combustion Engines (S. 458)</td>
<td>4</td>
<td>Bernhard Kehrwald</td>
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<tr>
<td>T-MACH-105167</td>
<td>Analysis Tools for Combustion Diagnostics (S. 372)</td>
<td>4</td>
<td>Uwe Wagner</td>
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<tr>
<td>T-MACH-102197</td>
<td>Gas Engines (S. 467)</td>
<td>4</td>
<td>Rainer Golloch</td>
</tr>
<tr>
<td>T-MACH-102199</td>
<td>Model Based Application Methods (S. 539)</td>
<td>4</td>
<td>Frank Kirschbaum</td>
</tr>
<tr>
<td>T-MACH-105169</td>
<td>Engine Measurement Techniques (S. 437)</td>
<td>4</td>
<td>Sören Bernhardt</td>
</tr>
</tbody>
</table>

Conditions

It is only possible to choose this module in combination with the module Combustion Engines I. The module is passed only after the final partial exam of Combustion Engines I is additionally passed. The course Combustion Engines II [2134131] has to be attended. Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:

- Module [M-MACH-101275] Combustion Engines I has to be started before taking this module.

Qualification Objectives

See courses.
Module: Control Engineering [M-ETIT-101156]

Responsibility: Sören Hohmann, Mathias Kluwe

Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

ECTS

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<tbody>
<tr>
<td>T-ETIT-100699</td>
<td>Modelling and Identification (S. 540)</td>
<td>4</td>
<td>Sören Hohmann</td>
</tr>
<tr>
<td>T-ETIT-101921</td>
<td>System Dynamics and Control Engineering (S. 636)</td>
<td>6</td>
<td>Sören Hohmann</td>
</tr>
</tbody>
</table>

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- get familiar with the basic concepts of control theory,
- learn and understand the elements, the structure and the behavior of dynamic systems,
- have insight in the problems of control and intuition about methods available to solve those problems as well in frequency domain as in time domain,
- get familiar with the basic principles and methods for the theoretical and experimental modelling of dynamic systems.

Content
This module familiarizes students with the basic elements, structures and the behavior of dynamic systems. Both time continuous and time discrete models are regarded. The students gain insight into the problems of control design and methods available to solve such problems in frequency and time domain. Above that, the students learn the basic principles and methods for the theoretical and experimental modelling of dynamic systems.
Module: Emphasis in Fundamentals of Engineering [M-MACH-101261]

Responsibility: Michael Hoffmann

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Contents:
- Vertiefung ingenieurwissenschaftlicher Grundlagen
  Non-Compulsory Block; min. 9 ECTS

<table>
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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-ETIT-100534</td>
<td>Electrical Engineering for Business Engineers, Part II (S. 431)</td>
<td>5</td>
<td>Wolfgang Menesklou</td>
</tr>
<tr>
<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
</tr>
<tr>
<td>T-MACH-102210</td>
<td>Introduction to Engineering Mechanics II : Dynamics (S. 495)</td>
<td>5</td>
<td>Alexander Fidlin</td>
</tr>
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</table>

Learning Control / Examinations
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 examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Students acquire and deepen skills in engineering fundamentals and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.

Remarks
Starting winter term 2016/2017 the course “Introduction to Engineering Mechanics II : Dynamics” [2162276] will be held in winter term.

Workload
See German version.
**Module: Emphasis Materials Science [M-MACH-101262]**

**Responsibility:** Michael Hoffmann

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

### Course Overview

#### Vertiefung Werkstoffkunde
Non-Compulsory Block; min. 9 ECTS

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<tr>
<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102141</td>
<td>Constitution and Properties of Wear-resistant Materials (S. 406)</td>
<td>4</td>
<td>Sven Ulrich</td>
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<tr>
<td>T-MACH-100287</td>
<td>Introduction to Ceramics (S. 492)</td>
<td>6</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102102</td>
<td>Physical Basics of Laser Technology (S. 555)</td>
<td>5</td>
<td>Johannes Schneider</td>
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<td>T-MACH-102137</td>
<td>Polymer Engineering I (S. 559)</td>
<td>4</td>
<td>Peter Elsner</td>
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<tr>
<td>T-MACH-102138</td>
<td>Polymerengineering II (S. 560)</td>
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<tr>
<td>T-MACH-102139</td>
<td>Failure of Structural Materials: Fatigue and Creep (S. 446)</td>
<td>4</td>
<td>Patric Gruber, Oliver Kraft, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102140</td>
<td>Failure of Structural Materials: Deformation and Fracture (S. 445)</td>
<td>4</td>
<td>Daniel Weygand, Oliver Kraft, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102157</td>
<td>High Performance Powder Metallurgy Materials (S. 476)</td>
<td>4</td>
<td>Rainer Oberacker</td>
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<tr>
<td>T-MACH-102179</td>
<td>Structural Ceramics (S. 635)</td>
<td>4</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102170</td>
<td>Structural and Phase Analysis (S. 634)</td>
<td>4</td>
<td>Susanne Wagner</td>
</tr>
<tr>
<td>T-MACH-100531</td>
<td>Systematic Materials Selection (S. 637)</td>
<td>5</td>
<td>Stefan Dietrich</td>
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</table>

### Conditions
Successful passing of the corresponding modules of the basic program.

### Qualification Objectives
Students acquire and deepen skills in fundamentals of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

### Content
The module content depends on the elected courses.
Module: Energy Generation and Network Components [M-ETIT-101165]

Responsibility: Thomas Leibfried, Bernd Hoferer

Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<td>9</td>
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Compulsory

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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-ETIT-101924</td>
<td>Power Generation (S. 561)</td>
<td>3</td>
<td>Bernd Hoferer</td>
</tr>
<tr>
<td>T-ETIT-101925</td>
<td>Design and Operation of Power Transformers (S. 417)</td>
<td>3</td>
<td>N. N., Mitarbeiter</td>
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<tr>
<td>T-ETIT-101927</td>
<td>Automation of Power Grids (S. 378)</td>
<td>3</td>
<td>N.N.</td>
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</table>

Learning Control / Examinations
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 examinations take place at the beginning of the recess period. 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 weighted average of the grades for each course and truncated after the first decimal.

Conditions
It is only possible to choose this module in combination with the module [Power Networks [M-ETIT-102379]]. The module is passed only after the final partial exam of [Power Networks] is additionally passed.
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
• Module [M-ETIT-102379] Power Network has to be started before taking this module.

Qualification Objectives
The student
• has basic and advanced knowledge of electrical power engineering,
• is capable to analyse, calculate and develop electrical power engineering systems.

Content
The module deals with basic knowledge about the structure and operation of electrical power networks and their needed facilities. Further lectures give an insight into specific topics, such as Automation in electric power engineering or the procedures for generating electrical energy.

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

Responsibility:

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences

ECTS: 9
Recurrence: Once
Level: 3

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

<table>
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<th>Identifier</th>
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<tbody>
<tr>
<td>T-ETIT-100724</td>
<td>Photovoltaics (S. 554)</td>
<td>3</td>
<td>N.N.</td>
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<tr>
<td>T-ETIT-101924</td>
<td>Power Generation (S. 561)</td>
<td>3</td>
<td>Bernd Hoferer</td>
</tr>
<tr>
<td>T-MACH-100966</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (S. 386)</td>
<td>3</td>
<td>Andreas Guber</td>
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<tr>
<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 387)</td>
<td>3</td>
<td>Andreas Guber</td>
</tr>
<tr>
<td>T-MACH-100968</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 388)</td>
<td>3</td>
<td>Andreas Guber</td>
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<tr>
<td>T-MACH-102107</td>
<td>Quality Management (S. 587)</td>
<td>4</td>
<td>Gisela Lanza</td>
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<tr>
<td>T-MACH-102176</td>
<td>Current Topics on BioMEMS (S. 410)</td>
<td>3</td>
<td>Andreas Guber</td>
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<td>T-MACH-105234</td>
<td>Windpower (S. 680)</td>
<td>4</td>
<td>Norbert Lewald</td>
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<tr>
<td>T-BGU-100139</td>
<td>Hydro Power Engineering (S. 479)</td>
<td>6</td>
<td>Peter Oberle</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment of the module is determined by the respective module coordinator. It can either be in the form of a general exam or partial exams, and must be contain at least 9 credit points and at least 6 hours per week. The examination may contain presentations, experiments, laboratories, term papers, etc. At least 50 percent of the module examination has to be in the form of a written or an oral examination (according to Section 4 (2), 1 or 2 of the examination regulation).

The formation of the overall grade of the module will be determined by the respective module coordinator.

Conditions
See German version.

Qualification Objectives
See German version.

Content
Entsprechend dem interdisziplinären Profil des Studiengangs können technisch-orientierte Lehrveranstaltungen zu einem außerplanmäßigen Ingenieurmodul zusammengestellt werden, die nicht oder nicht in dieser Kombination im Modulhandbuch des Studiengangs aufgeführt sind. Die im außerplanmäßigen Ingenieurmodul zusammengestellten technisch-orientierten Lehrveranstaltungen umfassen dabei in Summe mindestens 9 LP und mindestens 6 SWS.
Zunehmend bieten ingenieurwissenschaftliche Fakultäten Lehrveranstaltungen mit nicht technischem, meist wirtschaftswissenschaftlichem Bezug an. Diese aus ingenieurwissenschaftlicher Sicht sinnvolle Ergänzung zur technischen Ausbildung ihrer Studierenden, ist für die Studiengänge der Fakultät für Wirtschaftswissenschaften nicht geeignet. Daher genehmigt der Prüfungsausschuss solche Lehrveranstaltungen grundsätzlich nicht im Rahmen der zu erwerbenden 9 LP des außerplanmäßigen Ingenieurmoduls. Wer dennoch solche Lehrveranstaltungen in die Fachprüfung Ingenieurwissenschaften integrieren möchte, kann – in Übereinstimmung mit dem zuständigen Prüfer - ein Modul zusammenstellen, das dann entsprechend mehr Leistungspunkte umfassen muss.

Remarks
Die oben stehende Aufstellung ist nicht vollständig, sondern enthält nur eine Auswahl möglicher Teilleistungen. Die Liste wird

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Module: Fundamentals of construction [M-BGU-101004]

**Responsibility:** Shervin Haghsheno

**Organisation:** KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

<table>
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<th>ECTS</th>
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<tr>
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<td>Construction Technology (S. 408) 6</td>
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<tr>
<td>T-BGU-101675</td>
<td>Project Management (S. 581) 3</td>
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<td>Shervin Haghsheno</td>
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</table>

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**

The student

- is familiar with all substantial domains of construction
- knows and understands substantial construction methods and construction machines
- masters basic construction calculations
- knows and understands the fundamentals of project management in civil engineering

Can apply his / her knowledge in a goal-oriented manner to accomplish a construction project efficiently

**Content**

Courses of this module comprise methods and machines from all construction domains. Specifically, the module covers production planning as well as substantial parts of structural engineering and underground engineering, including auxiliary systems. In addition to the explanation of fundamentals, machines, and methods the courses include performance calculations. Further, students receive an introduction to project management in civil engineering which includes project phases, project organization, and the columns of project management which are schedule management, cost management, and quality management.

**Remarks**

We encourage students to deepen their knowledge in construction by building additional customized modules from the courses offered by TMB. Please consult with the tutors of this module. Further information is available at www.tmb.kit.edu.
Module: Handling Characteristics of Motor Vehicles [M-MACH-101264]

Responsibility: Frank Gauterin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

**ECTS** | **Recurrence** | **Duration** | **Level**
--- | --- | --- | ---
9 | Once | 1 semester | 3

Fahrzeugeigenschaften
Non-Compulsory Block; min. 9 ECTS

<table>
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<th>Responsibility</th>
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<td>Handling Characteristics of Motor Vehicles I (S. 474)</td>
<td>3</td>
<td>Frank Gauterin</td>
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<tr>
<td>T-MACH-105153</td>
<td>Handling Characteristics of Motor Vehicles II (S. 475)</td>
<td>3</td>
<td>Hans-Joachim Unrau</td>
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<td>T-MACH-105154</td>
<td>Vehicle Comfort and Acoustics I (S. 641)</td>
<td>3</td>
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<tr>
<td>T-MACH-105155</td>
<td>Vehicle Comfort and Acoustics II (S. 642)</td>
<td>3</td>
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<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I (S. 643)</td>
<td>3</td>
<td>Dieter Ammon</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
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<tr>
<td>T-MACH-102177</td>
<td>Global Vehicle Evaluation within Virtual Road Test (S. 473)</td>
<td>3</td>
<td>Bernhard Schick</td>
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<td>T-MACH-102206</td>
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<td>T-MACH-102205</td>
<td>Vehicle Ride Comfort &amp; Acoustics II (S. 645)</td>
<td>4</td>
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Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] Materials Science is required before taking this module.

Qualification Objectives
The student
- knows and understands the characteristics of vehicles, owing to the construction and design tokens,
- knows and understands especially the factors being relevant for comfort and acoustics
- is capable of fundamentally evaluating and rating handling characteristics.

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

Workload
See German Version.
# Module: Integrated Production Planning [M-MACH-101272]

**Responsibility:** Volker Schulze  
**Organisation:** KIT-Fakultät für Maschinenbau  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:**  
- Engineering Sciences/Specialisation program  
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
- Additional Examinations

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<td>9</td>
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**Compulsory**

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<td>T-MACH-102106</td>
<td>Integrated Production Planning (S. 487)</td>
<td>9</td>
<td>Gisela Lanza</td>
</tr>
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</table>

**Conditions**  
Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**  
The students
- can discuss basic questions of production technology.  
- are able to apply the methods of integrated production planning they have learned about to new problems.  
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.  
- can apply the learned methods of integrated production planning to new problems.  
- can use their knowledge targeted for efficient production technology.

**Content**  
Within this engineering sciences-oriented module the students will get to learn principle aspects of organization and planning of production systems. Further information can be found at the description of the lecture “Integrated Production Planning”.

**Workload**  
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Natural Hazards and Risk Analysis 1 [M-WIWI-101646]

Responsibility: Michael Kunz
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 12 ECTS

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<tr>
<td>T-PHYS-103117</td>
<td>Geological Hazards and Risks for external students (S. 469)</td>
<td>4</td>
<td>Erwin Zehe</td>
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<td>T-BGU-101693</td>
<td>Hydrology (S. 480)</td>
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<td>Franz Nestmann</td>
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<td>T-BGU-101667</td>
<td>Hydraulic Engineering and Water Management (S. 478)</td>
<td>4</td>
<td>Stefan Hinz</td>
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<td>Remote Sensing, exam (S. 592)</td>
<td>4</td>
<td>Stefan Hinz</td>
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<td>T-BGU-101637</td>
<td>Systems of Remote Sensing, Prerequisite (S. 638)</td>
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<td>T-BGU-101638</td>
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<tr>
<td>T-BGU-101681</td>
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<td>3</td>
<td>Sven Wursthorn, Norbert Rösch</td>
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<tr>
<td>T-BGU-103541</td>
<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 498)</td>
<td>3</td>
<td>Sven Wursthorn, Norbert Rösch</td>
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<td>Procedures of Remote Sensing (S. 572)</td>
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<td>T-PHYS-105954</td>
<td>Exam on Meteorological Hazards (S. 441)</td>
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<td>Michael Kunz</td>
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<td>T-BGU-101814</td>
<td>Project in Applied Remote Sensing (S. 580)</td>
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<td>Stefan Hinz</td>
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Learning Control / Examinations
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.

Conditions
There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it is not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

Qualification Objectives
See German version

Content
See German version

Recommendations
The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Natural Hazards and Risk Analysis 2 [M-WIWI-101648]

Responsibility: Michael Kunz
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

ECTS: 9
Recurrence: Each term
Duration: 1 Semester
Language: Deutsch

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 12 ECTS

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<tr>
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<td>Exam on Meteorological Hazards (S. 441)</td>
<td>3</td>
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Learning Control / Examinations
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.

Conditions
There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

Modeled Conditions
The following conditions must be met:
- Module [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1 has to be started before taking this module.

Qualification Objectives
See German version

Content
See German version

Recommendations
The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination
for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

Remarks
Students, who successfully completed both modules Introduction to Natural Hazards and Risk Analysis 1/2 (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Technical Logistics [M-MACH-101269]

Responsibility: Kai Furmans

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

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<th>ECTS</th>
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<tr>
<td>T-MACH-102151</td>
<td>Material Flow in Logistic Systems (S. 525)</td>
<td>6</td>
<td>Kai Furmans</td>
</tr>
<tr>
<td>T-MACH-102128</td>
<td>Information Systems and Supply Chain Management (S. 486)</td>
<td>4</td>
<td>Christoph Kilger</td>
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<tr>
<td>T-MACH-102163</td>
<td>Basics of Technical Logistics (S. 385)</td>
<td>6</td>
<td>Vladimir Madzharov, Martin Mittwollen</td>
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<td>T-MACH-102159</td>
<td>Elements and Systems of Technical Logistics (S. 432)</td>
<td>4</td>
<td>Vladimir Madzharov, Martin Mittwollen</td>
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<tr>
<td>T-MACH-102178</td>
<td>Elements of Technical Logistics and Project (S. 433)</td>
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<td>Vladimir Madzharov, Martin Mittwollen</td>
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<td>T-MACH-102160</td>
<td>Selected Applications of Technical Logistics (S. 595)</td>
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<td>Vladimir Madzharov, Martin Mittwollen</td>
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<td>Selected Applications of Technical Logistics and Project (S. 596)</td>
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<td>T-MACH-105149</td>
<td>Industrial Application of Technological Logistics Instancing Crane Systems (S. 482)</td>
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<td>Markus Golder</td>
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<td>T-MACH-105174</td>
<td>Warehousing and Distribution Systems (S. 646)</td>
<td>4</td>
<td>Melanie Schwab, Judith Weiblen</td>
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<td>Energy Efficient Intralogistic Systems (S. 435)</td>
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<td>Meike Braun, Frank Schönung</td>
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<td>Airport Logistics (S. 367)</td>
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<td>T-WIWI-103091</td>
<td>Production and Logistics Controlling (S. 577)</td>
<td>3</td>
<td>Helmut Wlcek</td>
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ECTS Recurrence Duration Level
9 Each term 1 semester 3

Einführung in die Technische Logistik
Non-Compulsory Block; min. 9 ECTS

Conditions
Successful passing of the corresponding modules of the basic program.
One of the core courses Material Flow in Logistic Systems [2117051] or Basics of Technical Logistics [2117095] or Elements and systems of Technical Logistics [2117096] is mandatory. Elements and systems of Technical Logistics is only allowed to be examined after Basics of Technical Logistics is passed successfully in this or an other module. For simultaneous attending of both courses, examination dates are sequenced accordingly.

Qualification Objectives
The student acquires
- well-founded knowledge and method knowledge in the main topics of technical logistics,
- expertise and understanding about the functionality of conveyor technology,
- ability for modeling logistic systems with adequate accuracy by using simple models,
- ability to evaluate logistic systems and to identify cause-and-effects-chains within logistic systems.

Content
The module Introduction to Technical Logistics provides first insights into main topics of technical logistics. Within the lectures, the interaction between several components of material handling systems will be clarified. The focus will be on technical characteristics...
of material handling technology and basics for sizing of material handling systems. To gain a deeper understanding, the course is accompanied by exercises and further improved by case studies.
Module: Introduction to Track Guided Transport Systems [M-BGU-102283]

Responsibility: Eberhard Hohnecker
Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<th>Recurrence</th>
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<tr>
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<td>2 Semester</td>
<td>Deutsch</td>
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Compulsory

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<tr>
<td>T-BGU-104580</td>
<td>Introduction to Track Guided Transport Systems (S. 503)</td>
<td>9</td>
<td>Eberhard Hohnecker</td>
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Conditions
Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.
Module: Machine Tools and Industrial Handling [M-MACH-101286]

Responsibility: Jürgen Fleischer

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<td>1 semester</td>
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Compulsory

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<tbody>
<tr>
<td>T-MACH-102158</td>
<td>Machine Tools and Industrial Handling (S. 511)</td>
<td>9</td>
<td>Jürgen Fleischer</td>
</tr>
</tbody>
</table>

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- are capable to explain the use and application of machine tools and handling devices as well as differentiate their characteristics and structure.
- are able to name and describe the essential components (frame, main spindles, feed axis, peripheral equipment, control) of machine tools.
- are capable to distinguish and select and describe the essential components regarding structure, characteristics advantages and disadvantages.
- are enabled to dimension the main components of machine tools.
- are able to name and describe the control principles of machine tools.
- are capable to name examples of machine tools and industrial handling as well as to deduce compare the essential components. Additionally they can allocate manufacturing processes.
- are enabled to identify drawbacks as well as derive and assess measures for improvements.
- are qualified to apply methods for selection and evaluation of machine tools.
- are experienced to deduce the particular failure characteristics of a ball screw.

Content
The module overviews the assembly, dimensioning and application of machine tools and industrial handling. A consolidated and practice oriented knowledge is imparted about the choice, dimensioning and assessment of production machines. At first, the major components of machine tools are explained systematically. At this, the characteristics of dimensioning of machine tools are described in detail. Finally, the application of machine tools is demonstrated by means of example machines of the manufacturing processes turning, milling, grinding, massive forming, sheet metal forming and toothing.
Module: Manufacturing Technology [M-MACH-101276]

Responsibility: Volker Schulze

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

**ECTS** | **Recurrence** | **Duration** | **Level**
--- | --- | --- | ---
9 | Each winter term | 1 semester | 3

Compulsory

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-102105</td>
<td>Manufacturing Technology (S. 522)</td>
<td>9</td>
<td>Frederik Zanger, Volker Schulze</td>
</tr>
</tbody>
</table>

**Conditions**
Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**
The students

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

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Microsystem Technology [M-MACH-101287]

Responsibility: Volker Saile
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program

Compulsory

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-105182</td>
<td>Introduction to Microsystem Technology I (S. 499)</td>
<td>3</td>
<td>Jan Gerrit Korvink, Andreas Guber</td>
</tr>
</tbody>
</table>

Wahlpflichtangebot
Non-Compulsory Block; min. 5 ECTS

<table>
<thead>
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<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
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</thead>
<tbody>
<tr>
<td>T-MACH-105183</td>
<td>Introduction to Microsystem Technology II (S. 500)</td>
<td>3</td>
<td>Andreas Guber</td>
</tr>
<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology (S. 564)</td>
<td>3</td>
<td>Arndt Last</td>
</tr>
<tr>
<td>T-MACH-100530</td>
<td>Physics for Engineers (S. 556)</td>
<td>6</td>
<td>Alexander Nesterov-Müller, Peter Gumbsch</td>
</tr>
<tr>
<td>T-MACH-102165</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 597)</td>
<td>3</td>
<td>Timo Mappes</td>
</tr>
<tr>
<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 387)</td>
<td>3</td>
<td>Andreas Guber</td>
</tr>
<tr>
<td>T-MACH-100968</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 388)</td>
<td>3</td>
<td>Andreas Guber</td>
</tr>
<tr>
<td>T-MACH-101910</td>
<td>Microactuators (S. 536)</td>
<td>3</td>
<td>Manfred Kohl</td>
</tr>
<tr>
<td>T-MACH-102152</td>
<td>Novel Actuators and Sensors (S. 548)</td>
<td>4</td>
<td>Manfred Kohl, Martin Sommer</td>
</tr>
<tr>
<td>T-MACH-102080</td>
<td>Nanotechnology with Clusterbeams (S. 543)</td>
<td>3</td>
<td>Jürgen Gspann</td>
</tr>
<tr>
<td>T-MACH-102172</td>
<td>Bionics for Engineers and Natural Scientists (S. 389)</td>
<td>3</td>
<td>Hendrik Hölscher</td>
</tr>
<tr>
<td>T-ETIT-101907</td>
<td>Optoelectronic Components (S. 550)</td>
<td>4</td>
<td>Wolfgang Freude</td>
</tr>
</tbody>
</table>

Conditions
Successful passing of the corresponding modules of the basic program.
This module cannot be combined with the module Microsystem Technology in the Master studies.
The course Basics of microsystem technology I [2141861] is compulsory and must be examined.

Qualification Objectives
- construction and production of e.g. mechanical, optical, fluidic and sensory microsystems.

Content
The module offers courses in microsystem technology. Knowledge is imparted in various fields like basics in construction and production of e.g. mechanical, optical, fluidic and sensory microsystems.

Remarks
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.
Module: Mobile Machines [M-MACH-101267]

Responsibility: Marcus Geimer
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

ECTS
Recurrence
Duration
Level
9
Once
1 semester
3

Mobile Arbeitsmaschinen
Non-Compulsory Block; min. 9 ECTS

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems (S. 451)</td>
<td>5</td>
<td>Stefan Haug, Martin Scherer, Marcus Geimer</td>
</tr>
<tr>
<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems (S. 615)</td>
<td>3</td>
<td>Marcus Geimer</td>
</tr>
<tr>
<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
<td>Marcus Geimer, Felix Weber</td>
</tr>
<tr>
<td>T-MACH-105168</td>
<td>Mobile Machines (S. 537)</td>
<td>9</td>
<td>Marcus Geimer</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
</tr>
<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment is carried out as a general oral exam (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.
The examination is offered every semester. Re-examinations are offered at every ordinary examination date.
The overall grade of the module is the grade of the oral examination.
The assessment may be carried out as partial oral exams (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. In this case the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.
The assessment procedures are described for each course of the module separately.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] Materials Science is required before taking this module.

Qualification Objectives
The student
- knows and understands the basic structure of the machines
- masters the basic skills to develop the selected machines

Content
In the module of Mobile Machines [WI4INGMB15] the students will learn the structure of the machines and deepen the knowledge of the subject for developing the machines. After conclusion the module the student will know the latest developments in mobile
machines and is able to evaluate the concepts and the trends of developments. The module is practically orientated and supported by industry partners.

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Mobility and Infrastructure [M-BGU-101067]

Responsibility: Ralf Roos
Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Curricular Anchorage: Compulsory Elective
Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

<table>
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<th>Duration</th>
<th>Level</th>
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<tbody>
<tr>
<td>9</td>
<td>Each summer term</td>
<td>1 semester</td>
<td>3</td>
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</table>

Compulsory

Identifier: T-BGU-101791 Course: Mobility and Infrastructure (S. 538) ECTS: 9 Responsibility: Ralf Roos

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Learning the fundamental terminology and methodology of spatial and transportation planning, traffic engineering as well as highway engineering

Content
Basic tasks and contents of different planning levels, for example: Land use and conflicts, provision of services and infrastructure as well as their costs, planning on local, regional, national and European level.

Fundamentals of transportation planning (convention for analyses, surveys of travel behaviour), fundamentals of traffic engineering

Design Basics in Highway Engineering: Road network layout, driving dynamics, principles of highway design; earthworks, pavements and their dimensioning.
Module: Power Network [M-ETIT-102379]

Responsibility: Thomas Leibfried, Bernd Hoferer

Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

<table>
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<tr>
<th>Identifier</th>
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<th>ECTS</th>
<th>Language</th>
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<tbody>
<tr>
<td>T-ETIT-101923</td>
<td>Electric Energy Systems (S. 429)</td>
<td>5</td>
<td>Deutsch</td>
<td>Thomas Leibfried</td>
</tr>
<tr>
<td>T-ETIT-100830</td>
<td>Power Network (S. 562)</td>
<td>6</td>
<td>Deutsch</td>
<td>Thomas Leibfried</td>
</tr>
</tbody>
</table>

Conditions
Successful passing of the corresponding modules of the basic program.
Module: Product Lifecycle Management [M-MACH-101270]

Responsibility: Jivka Ovtcharova

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

<table>
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<tr>
<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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Compulsory

<table>
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<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-105147</td>
<td>Product Lifecycle Management (S. 575)</td>
<td>6</td>
<td>Jivka Ovtcharova</td>
</tr>
</tbody>
</table>

Product Lifecycle Management

Non-Compulsory Block; min. 3 ECTS

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-102125</td>
<td>Computer Integrated Planning of New Products (S. 405)</td>
<td>4</td>
<td>Roland Kläger</td>
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<tr>
<td>T-MACH-102153</td>
<td>PLM-CAD Workshop (S. 558)</td>
<td>4</td>
<td>Jivka Ovtcharova</td>
</tr>
<tr>
<td>T-MACH-102181</td>
<td>PLM for Product Development in Mechatronics (S. 557)</td>
<td>4</td>
<td>Martin Eigner</td>
</tr>
<tr>
<td>T-MACH-102209</td>
<td>Information Engineering (S. 484)</td>
<td>3</td>
<td>Jivka Ovtcharova</td>
</tr>
<tr>
<td>T-MACH-105937</td>
<td>Information management in production (S. 485)</td>
<td>4</td>
<td>Oliver Riedel</td>
</tr>
</tbody>
</table>

Conditions
The course Product Lifecycle Management [2121350] is compulsory and has to be passed
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students should:

- have basic knowledge about the challenges in product and process data management regarding the whole product lifecycle;
- have understanding about challenges and functional concepts of product lifecycle management;
- be able to operate common PLM systems.

Content
This module describes management and organizational approaches of Product Lifecycle Management, their application in IT and the potential benefits of PLM system solutions. Optional courses of this module introduce current product development processes in the scope of enterprise PLM system solutions.
Module: Rail System Technology [M-MACH-101274]

Responsibility: Peter Gratzfeld
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

<table>
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<tr>
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<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>Each winter term</td>
<td>1 semester</td>
<td>3</td>
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<tr>
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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-MACH-102143</td>
<td>Rail System Technology (S. 588)</td>
<td>9</td>
<td>Peter Gratzfeld</td>
</tr>
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</table>

Learning Control / Examinations
The assessment is carried out as a general oral exam (45 min.) (according to Section 4(2), 2 of the examination regulation) of the single courses of this module. The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The overall grade of the module is the grade of the oral examination.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- They deduct the fundamental requirements for rail vehicles out of it and assess concepts of rail vehicles.
- They know about major systems in a rail vehicle and evaluate their fitness in specific fields of application.
- The students realize that the typical business model in railway industry is a project. They learn main features and characteristics of project management in this area.

Content
- Overview about fundamental components of a modern rail system (vehicles, infrastructure, operation)
- History and economic impact of rail systems
- Vehicle dynamics, wheel-rail-contact, train protection, traction power supply
- Main systems of rail vehicles (electric and non-electric traction drive, bogies, brakes)
- Vehicle concepts for mass transit and main line
- Main features and characteristics of project management in railway industry (project management system, organization, main processes)

Recommendations
The lectures can be taken simultaneously.

Workload
1. Regular attendance: 63 hours
2. Self-study: 63 hours
3. Exam and preparation: 144 hours
Module: Specialization in Production Engineering [M-MACH-101284]

Responsibility: Volker Schulze

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

Vertiefung der Produktionstechnik
Non-Compulsory Block; min. 9 ECTS

<table>
<thead>
<tr>
<th>Identifier</th>
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<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-MACH-102107</td>
<td>Quality Management (S. 587)</td>
<td>4</td>
<td>Gisela Lanza</td>
</tr>
<tr>
<td>T-MACH-105166</td>
<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry (S. 527)</td>
<td>4</td>
<td>Stefan Kienzle, Dieter Steegmüller</td>
</tr>
<tr>
<td>T-MACH-105177</td>
<td>Metal Forming (S. 534)</td>
<td>4</td>
<td>Florian Herlan</td>
</tr>
<tr>
<td>T-MACH-105185</td>
<td>Control Technology (S. 409)</td>
<td>4</td>
<td>Christoph Gönnheimer</td>
</tr>
<tr>
<td>T-MACH-102148</td>
<td>Gear Cutting Technology (S. 468)</td>
<td>4</td>
<td>Markus Klaiber</td>
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<tr>
<td>T-MACH-102189</td>
<td>Production Technology and Management in Automotive Industry (S. 579)</td>
<td>4</td>
<td>Volker Michael Stauch</td>
</tr>
<tr>
<td>T-MACH-105188</td>
<td>Integrative Strategies in Production and Development of High Performance Cars (S. 488)</td>
<td>4</td>
<td>Karl-Hubert Schlichtenmayer</td>
</tr>
</tbody>
</table>

Qualification Objectives

Der/ die Studierende

- besitzt grundlegende Kenntnisse über die industrielle Anwendung der Informationstechnologie im Gebiet der Produktentstehung,
- versteht die gegenwärtige und zukünftige Nutzung von Informationssystemen im Produktentstehungsprozess im Kontext des Product Lifecycle Managements und des Virtual Engineering,
- ist in der Lage, gängige Cad- und PLM-Systeme im Produktentstehungsprozess einzusetzen.

Content


Remarks

**Module: Vehicle Development [M-MACH-101265]**

**Responsibility:** Frank Gauterin

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

**ECTS**
- **Recurrence:** Once
- **Duration:** 1 semester
- **Level:** 3

**Fahrzeugentwicklung**
Non-Compulsory Block; min. 9 ECTS

<table>
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<tr>
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<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I (S. 643)</td>
<td>3</td>
<td>Dieter Ammon</td>
</tr>
<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
</tr>
<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
</tr>
<tr>
<td>T-MACH-102207</td>
<td>Tires and Wheel Development for Passenger Cars (S. 640)</td>
<td>3</td>
<td>Günter Leister</td>
</tr>
<tr>
<td>T-MACH-105162</td>
<td>Fundamentals of Automobile Development I (S. 463)</td>
<td>1,5</td>
<td>Rolf Frech</td>
</tr>
<tr>
<td>T-MACH-105163</td>
<td>Fundamentals of Automobile Development II (S. 464)</td>
<td>1,5</td>
<td>Rolf Frech</td>
</tr>
<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
</tr>
<tr>
<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems (S. 615)</td>
<td>3</td>
<td>Marcus Geimer</td>
</tr>
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</table>

**Learning Control / Examinations**
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.

**Conditions**
Successful passing of the corresponding modules of the basic program.

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

**Content**
See courses.

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

**Workload**
See German version.
8 Statistics

Module: Introduction to Statistics [M-WIWI-101432]

Responsibility: Melanie Schienle
Organization: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Statistics

<table>
<thead>
<tr>
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<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102737</td>
<td>Statistics I (S. 631)</td>
<td>5</td>
<td>Melanie Schienle</td>
</tr>
<tr>
<td>T-WIWI-102738</td>
<td>Statistics II (S. 632)</td>
<td>5</td>
<td>Melanie Schienle</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
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.

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

Conditions
Notice: The lecture Statistics I [25008/25009] is part of the preliminary examination concerning Section 8(1) of the examination regulation. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Qualification Objectives
See German version.

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

Workload
The total workload for this module is approximately 300 hours. For further information see German version.
9 Mathematics

Module: Mathematics 1 [M-MATH-101676]

Responsibility: Günter Last
Organisation: KIT-Fakultät für Mathematik
Curricular Anchorage: Compulsory
Contained in: Mathematics

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
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<tr>
<td>T-MATH-102260</td>
<td>Mathematics I - Midterm Exam (S. 530)</td>
<td>3,5</td>
<td>Each winter term</td>
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<td>T-MATH-102261</td>
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Qualification Objectives
Der/die Studierende

Content
- Grundbegriffe der Aussagenlogik und der Mengenlehre
- Grundbegriffe der Kombinatorik
- Zahlbereiche und Grundbegriffe der Arithmetik
- Konvergenz von Folgen und Reihen
- Stetige Funktionen
- Differenzierbare Funktionen
- Potenzreihen und spezielle Funktionen
- Der Satz von Taylor
- Das Riemannintegral
Module: Mathematics 2 [M-MATH-101677]

Responsibility: Günter Last

Organisation: KIT-Fakultät für Mathematik

Curricular Anchorage: Compulsory

Contained in: Mathematics

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<td>T-MATH-102262</td>
<td>Mathematics II - Midterm Exam (S. 532)</td>
<td>3,5</td>
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<td>T-MATH-102263</td>
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Qualification Objectives

Der/die Studierende
• kennt die wichtigsten Konzepte der Matrizentheorie,
• besitzt grundlegende Kenntnisse der Differential- und Integralrechnung für Funktionen mehrerer Veränderlicher.

Content
• Lineare Gleichungssysteme
• Der n-dimensionale reelle Vektorraum
• Skalarprodukte, Länge und Winkel
• Lineare Abbildungen und Matrizen
• Determinanten
• Differentialrechnung mehrerer Veränderlicher
• Implizit definierte Funktionen
Module: Mathematics 3 [M-MATH-101679]

Responsibility: Günter Last
Organisation: KIT-Fakultät für Mathematik
Curricular Anchorage: Compulsory
Contained in: Mathematics

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<tr>
<td>T-MATH-102264</td>
<td>Mathematics III - Final Exam (S. 533)</td>
<td>7</td>
<td>Günter Last, Steffen Winter, Martin Folkers, Daniel Hug</td>
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</tbody>
</table>

Qualification Objectives
Der/die Studierende

- beherrscht die wichtigsten Konzepte der Linearen Algebra,

Content

- Das Bereichsintegral
- Der allgemeine Vektorraumbegriff
- Lineare Abbildungen
- Komplexe Zahlen
- Eigenwerte und Eigenvektoren
- Normierte Räume
- Der Fixpunktsatz von Banach
- Gewöhnliche Differentialgleichungen
- Lineare Differentialgleichungen
- Fourierreihen
- Integraltransformationen
10 Compulsory Elective Modules

10.1 Seminar module

Module: Seminar Module [M-WIWI-101816]

Responsibility: Studiendekan der KIT-Fakultät für Wirtschaftswissenschaften
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory
Contained in: Compulsory Elective Modules/Seminar module

<table>
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<tr>
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<tbody>
<tr>
<td>T-WIWI-103485</td>
<td>Seminar in Informatics (Bachelor) (S. 604)</td>
<td>3</td>
<td>Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner</td>
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<tr>
<td>T-WIWI-103486</td>
<td>Seminar in Business Administration (Bachelor) (S. 600)</td>
<td>3</td>
<td>Martin Klarmann, Mariëse Uhrig-Homburg, Christof Weinhardt, Andreas Geyer-Schulz, Ju-Young Kim, Hagen Lindstädt, Thomas Lützkendorf, Stefan Nickel, Marcus Wouters, Petra Nieken, Wolf Fichtner, Hansjörg Fromm, Ute Werner, David Lorenz, Gerhard Satzger, Frank Schultmann, Bruno Neibecker, Orestis Terzidis, Marion Weissenberger-Eibl, Martin Ruckes</td>
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<tr>
<td>T-WIWI-103487</td>
<td>Seminar in Economics (Bachelor) (S. 602)</td>
<td>3</td>
<td>Kay Mitusch, Ingrid Ott, Jan Kowalski, Marten Hillebrand, Clemens Puppe, Johannes Philipp Reiß, Berthold Wigger</td>
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<tr>
<td>T-WIWI-103488</td>
<td>Seminar in Operations Research (Bachelor) (S. 608)</td>
<td>3</td>
<td>Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel</td>
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<tr>
<td>T-WIWI-103489</td>
<td>Seminar in Statistics (Bachelor) (S. 609)</td>
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<td>Wolf-Dieter Heller, Melanie Schienle, Oliver Grothe</td>
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<tr>
<td>T-WIWI-102755</td>
<td>Seminar in Engineering Science (Bachelor) (S. 603)</td>
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<tr>
<td>T-MATH-102265</td>
<td>Seminar in Mathematics (Bachelor) (S. 607)</td>
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<td>Günter Last, Martin Folkers</td>
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<tr>
<td>T-INFO-101997</td>
<td>Seminar: Legal Studies I (S. 610)</td>
<td>3</td>
<td>Thomas Dreier</td>
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</table>

Learning Control / Examinations

SPO 2015: The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characterization.

SPO 2007: The modul examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examintaion regulation). As key qualification one of the following courses must be chosen: Academic Learning HoC (2-3 credits), Key Qualifikations ZAK (1-3 credits) or Elective „Educational development for student teachers“ (2-3 credits). A detailed description of every singled assessment is given in the specific course characterization.

Conditions

All modules of the basic program should be completed. For further information see German version.

Qualification Objectives

- 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.

**Content**
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor. Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailed description of these qualifications is given in the section “Key Qualifications” of the module handbook. Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

**Remarks**
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

**Workload**
See German version.
### 10.2 Elective Module 1

#### 10.2.1 Business Administration

**Module: CRM and Service Management [M-WIWI-101460]**

- **Responsibility:** Andreas Geyer-Schulz
- **Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
- **Curricular Anchorage:** Compulsory Elective
- **Contained in:**
  - Business Administration/Specialisation program
  - Compulsory Elective Modules/Elective Module 1/Business Administration
  - Compulsory Elective Modules/Elective Module 2/Business Administration

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<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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**Wahlpflichtangebot**
Non-Compulsory Block; min. 2, max. 2 Courses

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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
</tr>
<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102595</td>
<td>Customer Relationship Management (S. 411)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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</table>

**Learning Control / Examinations**
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. Thereby every lecture is examined by a written exam (according to Section 4(2), 1 of the examination regulation) and by successful completion of exercises (according to Section 4 (2), 3 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.

**Conditions**
Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**
The following conditions must be met:


**Qualification Objectives**
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, ...).
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, ...).

Remarks
The lecture Customer Relationship Management [2540508] is given in English.
The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM is offered for a last time in the summer term 14. Details on the cycle and on the exams can be found on http://www.em.uni-karlsruhe.de/studies/.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Design, Construction and Sustainability Assessment of Buildings [M-WIWI-101467]

Responsibility: Thomas Lützkendorf
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

<table>
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Compulsory

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<tr>
<td>T-WIWI-102742</td>
<td>Design, Construction and Sustainability Assessment of Buildings I (S. 418)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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<tr>
<td>T-WIWI-102743</td>
<td>Design, Construction and Sustainability Assessment of Buildings II (S. 419)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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.

Recommendations
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.
Module: eBusiness and Service Management [M-WIWI-101434]

Responsibility: Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration

Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

ECTS Language Level
9 Deutsch 3

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard</td>
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<td>T-WIWI-102598</td>
<td>Management of Business Networks (S. 516)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<td></td>
<td>Securities Trading (S. 427)</td>
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<td>T-WIWI-102706</td>
<td>Special Topics in Information Engineering &amp; Management</td>
<td>4,5</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:


Qualification Objectives
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.

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 “Management of Business Networks”, “eFinance: Information engineering and management in finance” and “"eServices" constitute three different application domains in which the basic principles of the Internet Economy are deepened. In the course
“Management of Business Networks” the focus is set on the strategic aspects of management and information systems. It is held in English and teaches parts of the syllabus with the support of a case study elaborated with Lecturers from Concordia University, Montreal, or if applicable, Rotterdam School of Management. Thus the matter of strategic enterprise networks, a.k.a. smart business networks is also analysed by employing an international perspective.

The course "eFinance: information engineering and management for securities tradingprovides 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 services.

The theoric fundamentals of Information Engineering and Management 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 Engineering and Management.

Remarks
All practical Seminars offered at the IM can be chosen for Special Topics in Information Engineering & Management. Please update yourself on www.iism.kit.edu/im/lehre
Module: eFinance [M-WIWI-101402]

Responsibility: Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration

Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<th>Duration</th>
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### Compulsory

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<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
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### Ergänzungsangebot

Non-Compulsory Block; min. 4,5, max. 4,5 ECTS

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<tr>
<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
<td>1,5</td>
<td>Jörg Franke</td>
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### Learning Control / Examinations

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.

### Conditions

Successful passing of the corresponding modules of the basic program.

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

### Modeled Conditions

The following conditions must be met:


### Qualification Objectives

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.

### 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.

Remarks
The current seminar courses for this semester, which are complementary to this module, are listed on the following webpage: the http://www.iism.kit.edu/im/lehre
Module: Energy Economics [M-WIWI-101464]

Responsibility: Wolf Fichtner
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

<table>
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<th>Recurrence</th>
<th>Duration</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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**Compulsory**

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<tbody>
<tr>
<td>T-WIWI-102746</td>
<td>Introduction to Energy Economics (S. 493)</td>
<td>5,5</td>
<td>Wolf Fichtner</td>
</tr>
</tbody>
</table>

**Ergänzungsangebot**
Non-Compulsory Block; min. 3,5, max. 3,5 ECTS

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-100806</td>
<td>Renewable Energy-Resources, Technologies and Economics (S. 593)</td>
<td>3,5</td>
<td>Russell McKenna</td>
</tr>
<tr>
<td>T-WIWI-102607</td>
<td>Energy Policy (S. 436)</td>
<td>3,5</td>
<td>Martin Wietschel</td>
</tr>
</tbody>
</table>

**Learning Control / Examinations**
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.

**Conditions**
Successful passing of the corresponding modules of the basic program.
The lecture *Introduction into Energy Economics* [2581010] has to be examined.

**Modeled Conditions**
The following conditions must be met:

**Qualification Objectives**
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.

**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.)
**Corporate Governance in Energy Economics:** Challenges of the management of a large company in energy economics (superior leadership role, structures, processes and projects from a leadership perspective etc.)

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

**Recommendations**

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.

**Remarks**

Upon request, the authorisation for taking the examinations for modules of specialisation can be granted by the examination committee even if the mentioned conditions are not fulfilled. The approving statement of the coordinator of the module of specialisation claimed on the application form is not required for the module Energy Economics [TVWIIP2]. The application form has to be submitted to the examination committee of the faculty along with a current transcript of records (e.g. via letterbox).

Upon request at the institute, additional recognition of studies (e.g. from other universities) is possible in the module.

**Workload**

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

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

<table>
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<tr>
<th>Identifier</th>
<th>Course</th>
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<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tr>
<td>T-WIWI-102604</td>
<td>Investments (S. 504)</td>
<td>4.5</td>
<td>Each summer term</td>
<td>1 semester</td>
<td>3</td>
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<tr>
<td>T-WIWI-102605</td>
<td>Financial Management (S. 450)</td>
<td>4.5</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:


Qualification Objectives
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.

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

Responsibility: Martin Klarmann
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program

Compulsory

<table>
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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102805</td>
<td>Managing the Marketing Mix (S. 521)</td>
<td>4,5</td>
<td>Martin Klarmann</td>
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Ergänzungsangebot
Non-Compulsory Block; min. 4,5, max. 4,5 ECTS

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<tr>
<td>T-WIWI-102798</td>
<td>Brand Management (S. 390)</td>
<td>4,5</td>
<td>Bruno Neibecker</td>
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<tr>
<td>T-WIWI-102806</td>
<td>Services Marketing and B2B Marketing (S. 612)</td>
<td>3</td>
<td>Martin Klarmann, Ju-Young Kim</td>
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<tr>
<td>T-WIWI-102807</td>
<td>International Marketing (S. 490)</td>
<td>1,5</td>
<td>Martin Klarmann</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.
The course Marketing Mix is compulsory and must be examined.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
Ziel dieses Moduls ist es, Studierende auf eine Tätigkeit in Marketing oder Vertrieb vorzubereiten. Gerade in technisch orientierten Unternehmen werden hierfür gerne Mitarbeiter eingesetzt, die als Wirtschaftsingenieure oder Informationswirte auch selbst einen gewissen technischen Hintergrund haben.

Studierende
- kennen die wichtigsten Konzepte, Verfahren und Theorien der vier Instrumente des Marketing Mix (Produktmanagement, Preismanagement, Kommunikationsmanagement und Vertriebsmanagement)
- verfügen über das Wissen, Entscheidungen bezüglich der gegenwärtigen und zukünftigen Produkte (Produktinnovationen) zu treffen (z.B. mittels Conjoint-Analyse)
- wissen, wie Kunden Marken wahrnehmen und wie diese Wahrnehmung durch das Unternehmen beeinflusst werden kann
Elective Module 1

- verstehen, wie Kunden auf Preise reagieren (z.B. mittels Preis-Absatz-Funktionen)
- können Preise auf Basis konzeptioneller und quantitativer Überlegungen bestimmen
- kennen die Grundlagen der Preisdifferenzierung
- sind mit verschiedenen Instrumenten der Kommunikation vertraut (z.B. TV-Werbung) und können diese treffsicher gestalten
- treffen Kommunikationsentscheidungen systematisch (z.B. mittels Mediaplanung)
- können den Markt segmentieren und das Produkt positionieren
- wissen, wie die Wichtigkeit und Zufriedenheit von Kunden beurteilt werden können
- können die Beziehung zu Kunden und Vertriebspartnern gestalten
- wissen um Besonderheiten des Marketing im Dienstleistungs- und B2B-Bereich
- kennen die Besonderheiten des Marketing im internationalen Kontext

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 module in two ways:

- by choosing the course "Brand Management".
- by choosing the combination of the courses "Services- and B2B-Marketing" and "International Marketing".

Remarks
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.

Responsibility: Christof Weinhardt, Gerhard Satzger

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

<table>
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<tbody>
<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
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<tr>
<td>T-WIWI-105775</td>
<td>Foundations of Digital Services B (S. 454)</td>
<td>4,5</td>
<td>Stefan Nickel, Stefan Morana, Alexander Mädche</td>
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<tr>
<td>T-WIWI-105711</td>
<td>Practical Seminar Digital Services (S. 563)</td>
<td>4,5</td>
<td>Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Alexander Mädche, York Sure-Vetter, Gerhard Satzger</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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

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 pushes the 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.

Recommendations
None

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Human Resources and Organizations [M-WIWI-101513]

Responsibility: Petra Nieken
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program

Compulsory

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<tbody>
<tr>
<td>T-WIWI-102909</td>
<td>Human Resource Management (S. 477)</td>
<td>4,5</td>
<td>Petra Nieken</td>
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Ergänzungsangebot
Non-Compulsory Block; min. 4,5, max. 5,5 ECTS

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<tbody>
<tr>
<td>T-WIWI-102908</td>
<td>Personnel Policies and Labor Market Institutions (S. 553)</td>
<td>4,5</td>
<td>Petra Nieken</td>
</tr>
<tr>
<td>T-WIWI-102630</td>
<td>Managing Organizations (S. 620)</td>
<td>3,5</td>
<td>Hagen Lindstädt</td>
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<tr>
<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
<td>2</td>
<td>Hagen Lindstädt</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

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

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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.

**Recommendations**
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.
Module: Industrial Production I [M-WIWI-101437]

Responsibility: Frank Schultmann
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
-contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

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<th>ECTS</th>
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<tbody>
<tr>
<td>T-WIWI-102606</td>
<td>Fundamentals of Production Management (S. 466)</td>
<td>5,5</td>
<td>Frank Schultmann</td>
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Ergänzungsangebot
Non-Compulsory Block; min. 3.5, max. 3.5 ECTS

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<tbody>
<tr>
<td>T-WIWI-102820</td>
<td>Production Economics and Sustainability (S. 578)</td>
<td>3,5</td>
<td>Magnus Fröhling</td>
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<tr>
<td>T-WIWI-102870</td>
<td>Logistics and Supply Chain Management (S. 510)</td>
<td>3,5</td>
<td>Marcus Wiens</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.
The course “Fundamentals of Production Management” [2581950] and one additional activity have to be chosen.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
- 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.

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: Machine Learning for Finance and Data Science [M-WIWI-102753]**

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration

**Additional Examinations**

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<tr>
<td>T-WIWI-105712</td>
<td>Probabilistic Machine Learning for Finance and Data Science</td>
<td>4.5</td>
<td>Maxim Ulrich</td>
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<td>(S. 570)</td>
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<tr>
<td>T-WIWI-105714</td>
<td>Solving Finance Problems using Machine Learning</td>
<td>4.5</td>
<td>Maxim Ulrich</td>
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<tr>
<td></td>
<td>(S. 621)</td>
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</table>

**Learning Control / Examinations**

The assessment is carried out as a module wide exam which itself consists of several partial exams (according to Section 4 (2), 1-3 SPO). A written exam at the end of the semester (120 min) (§4(2), 1 SPO) accounts for 50% of the module-wide grade. Students who have failed the first exam are allowed to retake the exam (during the 4th lecture free week in the same summer term). Another 25% of the module grade is accounted for by the submission of weekly programming problem sets (during the first half of the semester). The presentation and submission of a machine learning programming project (during the 2nd half of the semester) accounts for the final 25% of the module-wide grade. Interested students can in addition earn a “Seminarschein”.

**Conditions**

A formal prerequisite for taking this module is that students successfully complete all partial exams of the module wide exam within the same semester (only).

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

We put students into the shoes of a chief risk manager of a global quant asset management firm. Students first learn the most essential finance concepts such as Markowitz approach to portfolio management, the Capital Asset Pricing Model to determine cost of capital (and expected asset returns) of investments, linear factor models to predict expected returns and systematic and unsystematic risk of investments. After completion of this first couple of learning points, students learn modern machine learning tools to accomplish superior predictions for future returns and risks of different asset classes (such as equity, fixed-income, derivatives).

Upon completion of the module, students will have a conceptual, analytical and practical working knowledge of the following concepts and implemented these using Python:

1. Financial Concepts
   - A.1 Portfolio Management
     - Markowitz
     - Black-Litterman
   - A.2 Predicting an asset’s expected return
     - CAPM, Fama-French, linear factor models
     - Fama-MacBeth
     - ARMA modeling
- State Space modeling
  A.3 Predicting an asset’s future risk
- ARCH/GARCH
- State Space modeling

1. Machine Learning concepts

B.1 ‘Supervised learning’ within linear and nonlinear models (e.g. least squares, maximum likelihood, Kalman Filter, MCMC)
B.2 ‘Unsupervised learning’ (e.g. PCA, SVD)

Content
This module provides a hands-on introduction to the use of machine learning for modeling financial markets. We will cover methods on how to predict asset returns, how to estimate the risk density of returns and respective risk premiums and how to build optimal portfolios. We will make use of modern statistical machine learning algorithms and test them rigorously with risk and asset management applications. The intuitive, yet analytical combination of machine learning on the one hand and financial applications on the other hand are a key feature of this module. The revealed knowledge will be useful for quantitative industry internships and jobs as well as for quantitative and/or data driven lectures, seminars and bachelor thesis at the FBV or other KIT institutes. In addition to studying the machine learning concepts, students receive numerous opportunities use modern machine learning software in order to solve current financial problems.

Recommendations
This module is self-contained. It is recommended that students have already heard other finance courses, although this is not a formal prerequisite. Students are assumed to have earned at least good grades during the KIT Bachelor’s math, stats, OR and IT courses.

Remarks
The courses of the module are held in English.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Management Accounting [M-WIWI-101498]

Responsibility: Marcus Wouters

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<th>ECTS</th>
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<tbody>
<tr>
<td>9</td>
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Compulsory

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<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102800</td>
<td>Management Accounting 1 (S. 513)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
</tr>
<tr>
<td>T-WIWI-102801</td>
<td>Management Accounting 2 (S. 514)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
</tr>
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</table>

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

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

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

Remarks
Students who like this module are probably also interested in the courses
- 2530216 Financial Management
- 2530210 Management Accounting

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

Responsibility: Thomas Lützkendorf
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program

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<tr>
<td>T-WIWI-102744</td>
<td>Real Estate Management I (S. 590)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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<tr>
<td>T-WIWI-102745</td>
<td>Real Estate Management II (S. 591)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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.

Recommendations
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)
Elective Module 1 is recommended.

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Risk and Insurance Management [M-WIWI-101436]

**Responsibility:** Ute Werner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

<table>
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<tbody>
<tr>
<td>T-WIWI-102603</td>
<td>Principles of Insurance Management (S. 569)</td>
<td>4,5</td>
<td>Ute Werner</td>
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<tr>
<td>T-WIWI-102608</td>
<td>Enterprise Risk Management (S. 439)</td>
<td>4,5</td>
<td>Ute Werner</td>
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</table>

**Learning Control / Examinations**

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 lectures are examined by oral presentations and related term papers in the context of the lectures. Furthermore, there is a final oral examination.

The grade of each examination consists of the oral presentation and the term paper (50 percent) and the oral examination (50 percent). 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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

See German version.

**Content**

See German version.
Module: Specialization in Customer Relationship Management [M-WIWI-101422]

Responsibility: Andreas Geyer-Schulz
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program

Non-Compulsory Block; min. 1, max. 2 Courses

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<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4.5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
<td>4.5</td>
<td>Andreas Geyer-Schulz</td>
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Non-Compulsory Block; max. 1 Courses

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<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4.5</td>
<td>Kay Mitusch</td>
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<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4.5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
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Learning Control / Examinations
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, 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.

Conditions
Successful passing of the corresponding modules of the basic program.

- 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.
- At least, one of the courses Analytic CRM [2540522] and Operative CRM [2540520] has to be taken.

Modeled Conditions
The following conditions must be met:
1. Module [M-WIWI-101460] CRM and Service Management has to be started before taking this module.
2. Successful completion of module [M-WIWI-101494] Fundamentals of Business Administration 1 is required before taking this module.

Qualification Objectives
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.

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 (Extraction / Translation / Loading). The process of modelling a data-warehouse as well as the so-called extraction, translation, 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, ...)

Remarks
The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM is offered for a last time in the summer term 14. Details on

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Strategy and Organization [M-WIWI-101425]

Responsibility: Hagen Lindstädt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<td>T-WIWI-102629</td>
<td>Management and Strategy (S. 515)</td>
<td>3.5</td>
<td>Hagen Lindstädt</td>
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<tr>
<td>T-WIWI-102630</td>
<td>Managing Organizations (S. 520)</td>
<td>3.5</td>
<td>Hagen Lindstädt</td>
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<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
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<td>Hagen Lindstädt</td>
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Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:


Qualification Objectives

See German version.

Content


Workload

The total workload for this module is approximately 270 hours. For further information see German version.
## Module: Supply Chain Management [M-WIWI-101421]

**Responsibility:** Stefan Nickel

**Organisation:**
KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:**
Compulsory Elective

**Contained in:**
Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

### ECTS Recurrence Duration Level

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### Wahlpflichtangebot
Non-Compulsory Block; min. 1, max. 2 Courses

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<tr>
<td>T-WIWI-102598</td>
<td>Management of Business Networks (S. 516)</td>
<td>4.5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102760</td>
<td>Management of Business Networks (Introduction) (S. 517)</td>
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<td>Christof Weinhardt</td>
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### Ergänzungsangebot
Non-Compulsory Block; max. 4 Courses

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<tr>
<td>T-WIWI-103061</td>
<td>Prerequisite for Facility Location and Strategic Supply Chain Management (S. 565)</td>
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<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
<td>4.5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
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<tr>
<td>T-MACH-102089</td>
<td>Logistics - Organisation, Design and Control of Logistic Systems (S. 508)</td>
<td>6</td>
<td>Kai Furmans</td>
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</table>

### Learning Control / Examinations

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.

### Conditions

At least one of the courses Management of Business Networks [2590452] and Management of Business Networks (Introduction) [2540496] has to be taken.

Successful passing of the corresponding modules of the basic program.

### Modeled Conditions

The following conditions must be met:


### Qualification Objectives

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

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 “Management of Business Networks” the focus is set on the strategic aspects of management and information systems. The course is held in English and teaches parts of the syllabus with the support of a case study elaborated with Prof. Kersten from Concordia University, Montreal, Canada. The course MBN introduction is consisting out of the first part of the regular MBN lecture, but as it has less credits will not include the analysis of the case study. The module is completed by an elective course addressing appropriate optimization methods for the Supply Chain Management and for modern logistic approaches.

Remarks
The planned lectures in the next terms can be found on the websites of the respective institutes IIISM, IFL and IOR.
**Module: Topics in Finance I [M-WIWI-101465]**

**Responsibility:** Marliese Uhrig-Homburg, Martin Ruckes

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration/Specialisation program

**Curricular Anchorage:** Compulsory Elective Modules/Elective Module 1/Business Administration

**Curricular Anchorage:** Compulsory Elective Modules/Elective Module 2/Business Administration

**Curricular Anchorage:** Additional Examinations

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**ECTS**

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<tr>
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<td>Financial Intermediation (S. 449)</td>
<td>4,5</td>
<td>Martin Ruckes</td>
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<tr>
<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
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<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
<td>1,5</td>
<td>Jörg Franke</td>
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<tr>
<td>T-WIWI-102626</td>
<td>Business Strategies of Banks (S. 397)</td>
<td>3</td>
<td>Wolfgang Müller</td>
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<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
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<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
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<td>Christof Weinhardt</td>
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<td>T-WIWI-102790</td>
<td>Specific Aspects in Taxation (S. 629)</td>
<td>4,5</td>
<td>Armin Bader, Berthold Wigger</td>
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<td>T-WIWI-102879</td>
<td>Asset Management (S. 376)</td>
<td>3</td>
<td>Andreas Sauer</td>
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**Wahlpflichtangebot**

Non-Compulsory Block; min. 9, max. 9 ECTS

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**Learning Control / Examinations**

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 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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

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.

**Modeled Conditions**

The following conditions must be met:

3. Module [M-WIWI-101435] Essentials of Finance has to be started before taking this module.

**Qualification Objectives**

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

**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.
Recommendations
None
## Module: Topics in Finance II [M-WIWI-101423]

**Responsibility:** Marliese Uhrig-Homburg, Martin Ruckes  
**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Business Administration/Specialisation program  
Compulsory Elective Modules/Elective Module 1/Business Administration  
Compulsory Elective Modules/Elective Module 2/Business Administration  
Additional Examinations

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<td>Martin Ruckes</td>
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<td>4,5</td>
<td>Christof Weinhardt</td>
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<td>Specific Aspects in Taxation (S. 629)</td>
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<td>Armin Bader, Berthold Wigger</td>
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<tr>
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<td>Asset Management (S. 376)</td>
<td>3</td>
<td>Andreas Sauer</td>
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</table>

### Learning Control / Examinations

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 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.

### Conditions

Successful passing of the corresponding modules of the basic program.

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*.

### Modeled Conditions

The following conditions must be met:

3. Module [M-WIWI-101435] *Essentials of Finance* has to be started before taking this module.

### Qualification Objectives

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

### Remarks

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.
Workload
The total workload for this module is approximately 270 hours.
10.2.2 Engineering Sciences

Module: Automotive Engineering [M-MACH-101266]

Responsibility: Frank Gauterin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program

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<td>Automotive Engineering (S. 379)</td>
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<td>Hans-Joachim Unrau, Frank Gauterin</td>
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<tr>
<td>T-MACH-102117</td>
<td>Automotive Engineering II (S. 381)</td>
<td>3</td>
<td>Hans-Joachim Unrau, Frank Gauterin</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
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<tr>
<td>T-MACH-102116</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies I (S. 459)</td>
<td>1,5</td>
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<td>T-MACH-102119</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies II (S. 460)</td>
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<td>T-MACH-102093</td>
<td>Fluid Power Systems (S. 451)</td>
<td>5</td>
<td>Stefan Haug, Martin Scherer, Marcus Geimer</td>
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<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
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<td>Automotive Engineering I (S. 380)</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] Materials Science is required before taking this module.

Qualification Objectives
The student
- knows the most important components of a vehicle,
- knows and understands the functioning and the interaction of the individual components,
- knows the basics of dimensioning the components.
Content
See course descriptions.

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

Workload
See German version.
Module: Combustion Engines I [M-MACH-101275]

Responsibility: Heiko Kubach

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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<td>1 semester</td>
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<td>T-MACH-102194</td>
<td>Combustion Engines I (S. 400)</td>
<td>5</td>
<td>Thomas Koch, Heiko Kubach</td>
</tr>
<tr>
<td>T-MACH-105564</td>
<td>Energy Conversion and Increased Efficiency in Internal Combustion Engines (S. 434)</td>
<td>4</td>
<td>Thomas Koch, Heiko Kubach</td>
</tr>
</tbody>
</table>

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The student can name and explain the working principle of combustion engines. He is able to analyse and evaluate the combustion process. He is able to evaluate influences of gas exchange, mixture formation, fuels and exhaust gas aftertreatment on the combustion performance. He can solve basic research problems in the field of engine development. The student can name all important influences on the combustion process. He can analyse and evaluate the engine process considering efficiency, emissions and potential.

Content
- Introduction, History, Concepts
- Working Principle and Thermodynamics
- Characteristic Parameters
- Air Path
- Fuel Path
- Energy Conversion
- Fuels
- Emissions
- Exhaust Gas Aftertreatment
- Reaction kinetics
- Gas exchange
- Ignition
- Flow field of gasoline engines
- Working process
- Pressure trace analysis
- Thermodynamic analysis of the high pressure process
- Exergy analysis and waste heat recuperation
- Aspects of sustainability
### Module: Combustion Engines II [M-MACH-101303]

**Responsibility:** Heiko Kubach  
**Organisation:** KIT-Fakultät für Maschinenbau  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:**  
- Engineering Sciences/Specialisation program  
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
- Additional Examinations

<table>
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<td>T-MACH-104609</td>
<td>Combustion Engines II (S. 401)</td>
<td>5 Heiko Kubach</td>
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**Verbrennungsmotoren II**  
Non-Compulsory Block; min. 4 ECTS

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<tbody>
<tr>
<td>T-MACH-105044</td>
<td>Fundamentals of Catalytic Exhaust Gas Aftertreatment (S. 465)</td>
<td>4</td>
<td>Egbert Lox</td>
</tr>
<tr>
<td>T-MACH-105173</td>
<td>Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines (S. 370)</td>
<td>4</td>
<td>Marcus Gohl</td>
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<tr>
<td>T-MACH-105184</td>
<td>Fuels and Lubricants for Combustion Engines (S. 458)</td>
<td>4</td>
<td>Bernhard Kehrwald</td>
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<tr>
<td>T-MACH-105167</td>
<td>Analysis Tools for Combustion Diagnostics (S. 372)</td>
<td>4</td>
<td>Uwe Wagner</td>
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<tr>
<td>T-MACH-102197</td>
<td>Gas Engines (S. 467)</td>
<td>4</td>
<td>Rainer Golloch</td>
</tr>
<tr>
<td>T-MACH-102199</td>
<td>Model Based Application Methods (S. 539)</td>
<td>4</td>
<td>Frank Kirschbaum</td>
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<tr>
<td>T-MACH-105169</td>
<td>Engine Measurement Techniques (S. 437)</td>
<td>4</td>
<td>Sören Bernhardt</td>
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</table>

**Conditions**  
It is only possible to choose this module in combination with the module *Combustion Engines I*. The module is passed only after the final partial exam of *Combustion Engines I* is additionally passed.  
The course *Combustion Engines II* [2134131] has to be attended.  
Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**  
The following conditions must be met:  
- Module [M-MACH-101275] *Combustion Engines I* has to be started before taking this module.

**Qualification Objectives**  
See courses.
Module: Control Engineering [M-ETIT-101156]

Responsibility: Sören Hohmann, Mathias Kluwe

Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences

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Compulsory

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<th>Responsibility</th>
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<tr>
<td>T-ETIT-100699</td>
<td>Modelling and Identification (S. 540)</td>
<td>4</td>
<td>Sören Hohmann</td>
</tr>
<tr>
<td>T-ETIT-101921</td>
<td>System Dynamics and Control Engineering (S. 636)</td>
<td>6</td>
<td>Sören Hohmann</td>
</tr>
</tbody>
</table>

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- get familiar with the basic concepts of control theory,
- learn and understand the elements, the structure and the behavior of dynamic systems,
- have insight in the problems of control and intuition about methods available to solve those problems as well in frequency domain as in time domain,
- get familiar with the basic principles and methods for the theoretical and experimental modelling of dynamic systems.

Content
This module familiarizes students with the basic elements, structures and the behavior of dynamic systems. Both time continuous and time discrete models are regarded. The students gain insight into the problems of control design and methods available to solve such problems in frequency and time domain. Above that, the students learn the basic principles and methods for the theoretical and experimental modelling of dynamic systems.
Module: Emphasis in Fundamentals of Engineering [M-MACH-101261]

Responsibility: Michael Hoffmann
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
            Compulsory Elective Modules/Elective Module 1/Engineering Sciences
            Compulsory Elective Modules/Elective Module 2/Engineering Sciences
            Additional Examinations

Vertiefung ingenieurwissenschaftlicher Grundlagen
Non-Compulsory Block; min. 9 ECTS

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<tr>
<td>T-ETIT-100534</td>
<td>Electrical Engineering for Business Engineers, Part II (S. 431)</td>
<td>5</td>
<td>Wolfgang Menesklou</td>
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<tr>
<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102210</td>
<td>Introduction to Engineering Mechanics II : Dynamics (S. 495)</td>
<td>5</td>
<td>Alexander Fidlin</td>
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Learning Control / Examinations
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 examinations take place at the beginning of the recess period. 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 removed from the average of the partial examinations, with at least two partial exams need to be.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Students acquire and deepen skills in engineering fundamentals and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.

Remarks
Starting winter term 2016/1017 the course “Introduction to Engineering Mechanics II : Dynamics” [2162276] will be held in winter term.

Workload
See German version.
Module: Emphasis Materials Science [M-MACH-101262]

Responsibility: Michael Hoffmann

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

<table>
<thead>
<tr>
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<tr>
<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<td>T-MACH-102141</td>
<td>Constitution and Properties of Wearresistant Materials</td>
<td>4</td>
<td>Sven Ulrich</td>
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<td>T-MACH-100287</td>
<td>Introduction to Ceramics (S. 492)</td>
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<td>T-MACH-102102</td>
<td>Physical Basics of Laser Technology (S. 555)</td>
<td>5</td>
<td>Johannes Schneider</td>
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<td>T-MACH-102137</td>
<td>Polymer Engineering I (S. 559)</td>
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<td>Peter Elsner</td>
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<td>T-MACH-102138</td>
<td>Polymerengineering II (S. 560)</td>
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<td>T-MACH-102139</td>
<td>Failure of Structural Materials: Fatigue and Creep (S. 446)</td>
<td>4</td>
<td>Patric Gruber, Oliver Kraft, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102140</td>
<td>Failure of Structural Materials: Deformation and Fracture (S. 445)</td>
<td>4</td>
<td>Daniel Weygand, Oliver Kraft, Peter Gumbsch</td>
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<td>T-MACH-102157</td>
<td>High Performance Powder Metallurgy Materials (S. 476)</td>
<td>4</td>
<td>Rainer Oberacker</td>
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<td>T-MACH-102179</td>
<td>Structural Ceramics (S. 635)</td>
<td>4</td>
<td>Michael Hoffmann</td>
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<td>T-MACH-102170</td>
<td>Structural and Phase Analysis (S. 634)</td>
<td>4</td>
<td>Susanne Wagner</td>
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<td>T-MACH-100531</td>
<td>Systematic Materials Selection (S. 637)</td>
<td>5</td>
<td>Stefan Dietrich</td>
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Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Students acquire and deepen skills in fundamentals of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.
## Module: Energy Generation and Network Components [M-ETIT-101165]

**Responsibility:** Thomas Leibfried, Bernd Hoferer  
**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:**  
- Engineering Sciences/Specialisation program  
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
- Additional Examinations

### Compulsory

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<tr>
<td>T-ETIT-101924</td>
<td>Power Generation (S. 561)</td>
<td>3</td>
<td>Bernd Hoferer</td>
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<tr>
<td>T-ETIT-101925</td>
<td>Design and Operation of Power Transformers (S. 417)</td>
<td>3</td>
<td>N. N., Mitarbeiter</td>
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<td>T-ETIT-101927</td>
<td>Automation of Power Grids (S. 378)</td>
<td>3</td>
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### Learning Control / Examinations

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 examinations take place at the beginning of the recess period. 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 weighted average of the grades for each course and truncated after the first decimal.

### Conditions

It is only possible to choose this module in combination with the module *Power Networks* [WW3INGETIT3]. The module is passed only after the final partial exam of *Power Networks* is additionally passed.

Successful passing of the corresponding modules of the basic program.

### Modeled Conditions

The following conditions must be met:

- Module [M-ETIT-102379] *Power Network* has to be started before taking this module.

### Qualification Objectives

The student

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

### Content

The module deals with basic knowledge about the structure and operation of electrical power networks and their needed facilities. Further lectures give an insight into specific topics, such as Automation in electric power engineering or the procedures for generating electrical energy.

### Workload

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

Responsibility:

Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective Module
Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences

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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<td>Photovoltaics (S. 554)</td>
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<td>Power Generation (S. 561)</td>
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<td>Bernd Hoferer</td>
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<tr>
<td>T-MACH-100966</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (S. 386)</td>
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<td>Andreas Guber</td>
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<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 387)</td>
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<td>T-MACH-100968</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 388)</td>
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<td>T-MACH-102107</td>
<td>Quality Management (S. 587)</td>
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<td>T-MACH-102176</td>
<td>Current Topics on BioMEMS (S. 410)</td>
<td>3</td>
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<tr>
<td>T-MACH-105234</td>
<td>Windpower (S. 680)</td>
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<td>Norbert Lewald</td>
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<td>T-BGU-100139</td>
<td>Hydro Power Engineering (S. 479)</td>
<td>6</td>
<td>Peter Oberle</td>
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Learning Control / Examinations

The assessment of the module is determined by the respective module coordinator. It can either be in the form of a general exam or partial exams, and must be contain at least 9 credit points and at least 6 hours per week. The examination may contain presentations, experiments, laboratories, term papers, etc. At least 50 percent of the module examination has to be in the form of a written or an oral examination (according to Section 4 (2), 1 or 2 of the examination regulation).

The formation of the overall grade of the module will be determined by the respective module coordinator.

Conditions
See German version.

Qualification Objectives
See German version.

Content

Entsprechend dem interdisziplinären Profil des Studiengangs können technisch-orientierte Lehrveranstaltungen zu einem außerplanmäßigen Ingenieurmodul zusammengestellt werden, die nicht oder nicht in dieser Kombination im Modulhandbuch des Studiengangs aufgeführt sind. Die im außerplanmäßigen Ingenieurmodul zusammengestellten technisch-orientierten Lehrveranstaltungen umfassen dabei in Summe mindestens 9 LP und mindestens 6 SWS.

Zunehmend bieten ingenieurwissenschaftliche Fakultäten Lehrveranstaltungen mit nicht technischem, meist wirtschaftswissenschaftlichem Bezug an. Diese aus ingenieurwissenschaftlicher Sicht sinnvolle Ergänzung zur technischen Ausbildung ihrer Studierenden, ist für die Studiengänge der Fakultät für Wirtschaftswissenschaften nicht geeignet. Daher genehmigt der Prüfungsausschuss solche Lehrveranstaltungen grundsätzlich nicht im Rahmen der zu erwerbenden 9 LP des außerplanmäßigen Ingenieurmoduls. Wer dennoch solche Lehrveranstaltungen in die Fachprüfung Ingenieurwissenschaften integrieren möchte, kann – in Übereinstimmung mit dem zuständigen Prüfer - ein Modul zusammenstellen, das dann entsprechend mehr Leistungspunkte umfassen muss.

Remarks
Die oben stehende Aufstellung ist nicht vollständig, sondern enthält nur eine Auswahl möglicher Teilleistungen. Die Liste wird...
Module: Fundamentals of construction [M-BGU-101004]

Responsibility: Shervin Haghsheno

Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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<tr>
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<td>Each term</td>
<td>2 semester</td>
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Compulsory

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<td>Construction Technology (S. 408)</td>
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<tr>
<td>T-BGU-101675</td>
<td>Project Management (S. 581)</td>
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<td>Shervin Haghsheno</td>
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Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The student
- is familiar with all substantial domains of construction
- knows and understands substantial construction methods and construction machines
- masters basic construction calculations
- knows and understands the fundamentals of project management in civil engineering

can apply his / her knowledge in a goal-oriented manner to accomplish a construction project efficiently

Content
Courses of this module comprise methods and machines from all construction domains. Specifically, the module covers production planning as well as substantial parts of structural engineering and underground engineering, including auxiliary systems. In addition to the explanation of fundamentals, machines, and methods the courses include performance calculations. Further, students receive an introduction to project management in civil engineering which includes project phases, project organization, and the columns of project management which are schedule management, cost management, and quality management.

Remarks
We encourage students to deepen their knowledge in construction by building additional customized modules from the courses offered by TMB. Please consult with the tutors of this module. Further information is available at www.tmb.kit.edu.
### Module: Handling Characteristics of Motor Vehicles [M-MACH-101264]

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<td>Handling Characteristics of Motor Vehicles I (S. 474)</td>
<td>3</td>
<td>Frank Gauterin</td>
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<tr>
<td>T-MACH-105153</td>
<td>Handling Characteristics of Motor Vehicles II (S. 475)</td>
<td>3</td>
<td>Hans-Joachim Unrau</td>
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<tr>
<td>T-MACH-105154</td>
<td>Vehicle Comfort and Acoustics I (S. 641)</td>
<td>3</td>
<td>Frank Gauterin</td>
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<tr>
<td>T-MACH-105155</td>
<td>Vehicle Comfort and Acoustics II (S. 642)</td>
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<td>Frank Gauterin</td>
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<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I (S. 643)</td>
<td>3</td>
<td>Dieter Ammon</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4.5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
</tr>
<tr>
<td>T-MACH-102177</td>
<td>Global Vehicle Evaluation within Virtual Road Test (S. 473)</td>
<td>3</td>
<td>Bernhard Schick</td>
</tr>
<tr>
<td>T-MACH-102206</td>
<td>Vehicle Ride Comfort &amp; Acoustics I (S. 644)</td>
<td>4</td>
<td>Frank Gauterin</td>
</tr>
<tr>
<td>T-MACH-102205</td>
<td>Vehicle Ride Comfort &amp; Acoustics II (S. 645)</td>
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<td>Frank Gauterin</td>
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#### Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

#### Conditions
Successful passing of the corresponding modules of the basic program.

#### Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] *Materials Science* is required before taking this module.

#### Qualification Objectives
The student
- knows and understands the characteristics of vehicles, owing to the construction and design tokens,
- knows and understands especially the factors being relevant for comfort and acoustics
- is capable of fundamentally evaluating and rating handling characteristics.

#### Content
See courses.
Recommendations

Workload
See German Version.
Module: Integrated Production Planning [M-MACH-101272]

Responsibility: Volker Schulze
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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<tr>
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Compulsory

Identifier | Course                                 | ECTS | Responsibility |
------------|----------------------------------------|------|----------------|
T-MACH-102106 | Integrated Production Planning (S. 487) | 9    | Gisela Lanza   |

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning they have learned about to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.

Content
Within this engineering sciences-oriented module the students will get to learn principle aspects of organization and planning of production systems. Further information can be found at the description of the lecture “Integrated Production Planning”.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
**Module: Introduction to Natural Hazards and Risk Analysis 1 [M-WIWI-101646]**

**Responsibility:** Michael Kunz  
**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Engineering Sciences/Specialisation program  
Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
Additional Examinations

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<td>T-PHYS-103117</td>
<td>Geological Hazards and Risks for external students (S. 469)</td>
<td>4</td>
<td>Each term</td>
<td>1 Semester</td>
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<td>T-BGU-101693</td>
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<td>Hydraulic Engineering and Water Management (S. 478)</td>
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<td>T-BGU-101636</td>
<td>Remote Sensing, exam (S. 592)</td>
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<td>Systems of Remote Sensing, Prerequisite (S. 638)</td>
<td>1</td>
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<td>Procedures of Remote Sensing, Prerequisite (S. 573)</td>
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<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 497)</td>
<td>3</td>
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<td>T-BGU-103542</td>
<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 498)</td>
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<tr>
<td>T-BGU-103543</td>
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<td>T-BGU-101814</td>
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**Learning Control / Examinations**

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.

**Conditions**

There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

**Qualification Objectives**

See German version

**Content**

See German version

**Recommendations**

The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

**Remarks**

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
### Elective Module 1

**Module: Introduction to Natural Hazards and Risk Analysis 2 [M-WIWI-101648]**

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<td>Hydrology (S. 480)</td>
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<td>T-BGU-101636</td>
<td>Remote Sensing, exam (S. 592)</td>
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<td>Stefan Hinz</td>
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<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 497)</td>
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<td>Sven Wursthorn, Norbert Rösch</td>
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<tr>
<td>T-BGU-101814</td>
<td>Project in Applied Remote Sensing (S. 580)</td>
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<td>T-BGU-103541</td>
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<td>Sven Wursthorn, Norbert Rösch</td>
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<td>Uwe Weidner</td>
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**Wahlpfllichtangebot**

Non-Compulsory Block; min. 9, max. 12 ECTS

**Learning Control / Examinations**

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.

**Conditions**

There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

**Modedled Conditions**

The following conditions must be met:

- Module [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1 has to be started before taking this module.

**Qualification Objectives**

See German version

**Content**

See German version

**Recommendations**

The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination
for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

Remarks
Students, who successfully completed both modules Introduction to Natural Hazards and Risk Analysis 1/2 (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Technical Logistics [M-MACH-101269]

Responsibility: Kai Furmans
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Einführung in die Technische Logistik
Non-Compulsory Block; min. 9 ECTS

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<td>T-MACH-102151</td>
<td>Material Flow in Logistic Systems (S. 525)</td>
<td>6</td>
<td>Kai Furmans</td>
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<tr>
<td>T-MACH-102128</td>
<td>Information Systems and Supply Chain Management (S. 486)</td>
<td>4</td>
<td>Christoph Kilger</td>
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<tr>
<td>T-MACH-102163</td>
<td>Basics of Technical Logistics (S. 385)</td>
<td>6</td>
<td>Vladimir Madzharov, Martin Mittwollen</td>
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<tr>
<td>T-MACH-102159</td>
<td>Elements and Systems of Technical Logistics (S. 432)</td>
<td>4</td>
<td>Vladimir Madzharov, Martin Mittwollen</td>
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<tr>
<td>T-MACH-102178</td>
<td>Elements of Technical Logistics and Project (S. 433)</td>
<td>6</td>
<td>Vladimir Madzharov, Martin Mittwollen</td>
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<tr>
<td>T-MACH-102160</td>
<td>Selected Applications of Technical Logistics (S. 595)</td>
<td>4</td>
<td>Vladimir Madzharov, Martin Mittwollen</td>
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<tr>
<td>T-MACH-102161</td>
<td>Selected Applications of Technical Logistics and Project (S. 596)</td>
<td>6</td>
<td>Vladimir Madzharov, Martin Mittwollen</td>
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<td>T-MACH-105149</td>
<td>Industrial Application of Technological Logistics Instancing Crane Systems (S. 482)</td>
<td>4</td>
<td>Markus Golder</td>
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<td>T-MACH-105174</td>
<td>Warehousing and Distribution Systems (S. 646)</td>
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<td>Melanie Schwab, Judith Weiblen</td>
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<td>Energy Efficient Intralogistic Systems (S. 435)</td>
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<td>Meike Braun, Frank Schönung</td>
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<td>T-MACH-105165</td>
<td>Automotive Logistics (S. 382)</td>
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<td>T-MACH-105175</td>
<td>Airport Logistics (S. 367)</td>
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<td>Production and Logistics Controlling (S. 577)</td>
<td>3</td>
<td>Helmut Wlcek</td>
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Conditions
Successful passing of the corresponding modules of the basic program.
One of the core courses Material Flow in Logistic Systems [2117051] or Basics of Technical Logistics [2117095] or Elements and systems of Technical Logistics [2117096] is mandatory. Elements and systems of Technical Logistics is only allowed to be examined after Basics of Technical Logistics is passed successfully in this or an other module. For simultaneous attending of both courses, examination dates are sequenced accordingly.

Qualification Objectives
The student acquires
- well-founded knowledge and method knowledge in the main topics of technical logistics,
- expertise and understanding about the functionality of conveyor technology,
- ability for modeling logistic systems with adequate accuracy by using simple models,
- ability to evaluate logistic systems and to identify cause-and-effects-chains within logistic systems.

Content
The module Introduction to Technical Logistics provides first insights into main topics of technical logistics. Within the lectures, the interaction between several components of material handling systems will be clarified. The focus will be on technical characteristics
of material handling technology and basics for sizing of material handling systems. To gain a deeper understanding, the course is accompanied by exercises and further improved by case studies.
### Module: Introduction to Track Guided Transport Systems [M-BGU-102283]

**Responsibility:** Eberhard Hohnecker

**Organisation:** KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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**Compulsory**

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<td>Introduction to Track Guided Transport Systems (S. 503)</td>
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<td>Eberhard Hohnecker</td>
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**Conditions**

Successful passing of the engineering modules of the core program. For exceptions see § 17 Abs. 6 SPO.
Module: Machine Tools and Industrial Handling [M-MACH-101286]

Responsibility: Jürgen Fleischer

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
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Compulsory

Identifier Course ECTS Responsibility
T-MACH-102158 Machine Tools and Industrial Handling (S. 511) 9 Jürgen Fleischer

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- are capable to explain the use and application of machine tools and handling devices as well as differentiate their characteristics and structure.
- are able to name and describe the essential components (frame, main spindles, feed axis, peripheral equipment, control) of machine tools.
- Are capable to distinguish and select and describe the essential components regarding structure, characteristics advantages and disadvantages.
- are enabled to dimension the main components of machine tools.
- are able to name and describe the control principles of machine tools.
- are capable to name examples of machine tools and industrial handling as well as to deduce compare the essential components. Additionally they can allocate manufacturing processes.
- are enabled to identify drawbacks as well as derive and asses measures for improvements.
- are qualified to apply methods for selection and evaluation of machine tools.
- are experienced to deduce the particular failure characteristics of a ball screw.

Content
The module overviews the assembly, dimensioning and application of machine tools and industrial handling. A consolidated and practice oriented knowledge is imparted about the choice, dimensioning and assessment of production machines. At first, the major components of machine tools are explained systematically. At this, the characteristics of dimensioning of machine tools are described in detail. Finally, the application of machine tools is demonstrated by means of example machines of the manufacturing processes turning, milling, grinding, massive forming, sheet metal forming and toothing.
Module: Manufacturing Technology [M-MACH-101276]

Responsibility: Volker Schulze
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Compulsory

Identifier | Course | ECTS | Responsibility
---|--------|------|-----------------|
T-MACH-102105 | Manufacturing Technology (S. 522) | 9 | Frederik Zanger, Volker Schulze

Conditions
Successful passing of the corresponding modules of the basic program.

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

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
### Module: Microsystem Technology [M-MACH-101287]

**Responsibility:** Volker Saile

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

**Compulsory Elective Modules/Elective Module 1/Engineering Sciences**

**Compulsory Elective Modules/Elective Module 2/Engineering Sciences**

### Additional Examinations

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<td>Jan Gerrit Korvink, Andreas Guber</td>
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<td>T-MACH-105183</td>
<td>Introduction to Microsystem Technology II (S. 500)</td>
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<td>Andreas Guber</td>
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<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology (S. 564)</td>
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<td>T-MACH-100530</td>
<td>Physics for Engineers (S. 556)</td>
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<td>Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 597)</td>
<td>3</td>
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<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 387)</td>
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<td>T-MACH-101910</td>
<td>Microactuators (S. 536)</td>
<td>3</td>
<td>Manfred Kohl</td>
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<td>T-MACH-102152</td>
<td>Novel Actuators and Sensors (S. 548)</td>
<td>4</td>
<td>Manfred Kohl, Martin Sommer</td>
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<td>T-MACH-102080</td>
<td>Nanotechnology with Clusterbeams (S. 543)</td>
<td>3</td>
<td>Jürgen Gspann</td>
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<td>Bionics for Engineers and Natural Scientists (S. 389)</td>
<td>3</td>
<td>Hendrik Hölscher</td>
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<td>T-ETIT-101907</td>
<td>Optoelectronic Components (S. 550)</td>
<td>4</td>
<td>Wolfgang Freude</td>
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### Conditions
Successful passing of the corresponding modules of the basic program.

This module cannot be combined with the module Microsystem Technology in the Master studies.

The course Basics of microsystem technology I [2141861] is compulsory and must be examined.

### Qualification Objectives

- construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

### Content

The module offers courses in microsystem technology. Knowledge is imparted in various fields like basics in construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

### Remarks

If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.
Module: Mobile Machines [M-MACH-101267]

Responsibility: Marcus Geimer
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
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<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
<td>Once</td>
<td>1 semester</td>
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<tr>
<td>T-MACH-105168</td>
<td>Mobile Machines (S. 537)</td>
<td>9</td>
<td>Once</td>
<td>1 semester</td>
<td>3</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
<td>1,5</td>
<td>Once</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1,5</td>
<td>Once</td>
<td>1 semester</td>
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Learning Control / Examinations
The assessment is carried out as a general oral exam (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.
The examination is offered every semester. Re-examinations are offered at every ordinary examination date.
The overall grade of the module is the grade of the oral examination.
The assessment may be carried out as partial oral exams (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. In this case the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.
The assessment procedures are described for each course of the module separately.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] "Materials Science" is required before taking this module.

Qualification Objectives
The student
- knows and understands the basic structure of the machines
- masters the basic skills to develop the selected machines

Content
In the module of Mobile Machines [WI14NGMB15] the students will learn the structure of the machines and deepen the knowledge of the subject for developing the machines. After conclusion the module the student will know the latest developments in mobile
machines and is able to evaluate the concepts and the trends of developments. The module is practically orientated and supported by industry partners.

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Mobility and Infrastructure [M-BGU-101067]

Responsibility: Ralf Roos
Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Compulsory

Identifier Course ECTS Responsibility
T-BGU-101791 Mobility and Infrastructure (S. 538) 9 Ralf Roos

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Learning the fundamental terminology and methodology of spatial and transportation planning, traffic engineering as well as highway engineering

Content
Basic tasks and contents of different planning levels, for example: Land use and conflicts, provision of services and infrastructure as well as their costs, planning on local, regional, national and European level.

Fundamentals of transportation planning (convention for analyses, surveys of travel behaviour), fundamentals of traffic engineering

Design Basics in Highway Engineering: Road network layout, driving dynamics, principles of highway design; earthworks, pavements and their dimensioning
Module: Power Network [M-ETIT-102379]

Responsibility: Thomas Leibfried, Bernd Hoferer

Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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Compulsory

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<tr>
<td>T-ETIT-101923</td>
<td>Electric Energy Systems (S. 429)</td>
<td>5</td>
<td>Thomas Leibfried</td>
</tr>
<tr>
<td>T-ETIT-100830</td>
<td>Power Network (S. 562)</td>
<td>6</td>
<td>Thomas Leibfried</td>
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Conditions
Successful passing of the corresponding modules of the basic program.
Module: Product Lifecycle Management [M-MACH-101270]

Responsibility: Jivka Ovtcharova
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Compulsory

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<th>ECTS</th>
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<tr>
<td>T-MACH-105147</td>
<td>Product Lifecycle Management (S. 575)</td>
<td>6</td>
<td>Jivka Ovtcharova</td>
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Non-Compulsory Block; min. 3 ECTS

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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-MACH-102125</td>
<td>Computer Integrated Planning of New Products (S. 405)</td>
<td>4</td>
<td>Roland Kläger</td>
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<tr>
<td>T-MACH-102153</td>
<td>PLM-CAD Workshop (S. 558)</td>
<td>4</td>
<td>Jivka Ovtcharova</td>
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<tr>
<td>T-MACH-102181</td>
<td>PLM for Product Development in Mechatronics (S. 557)</td>
<td>4</td>
<td>Martin Eigner</td>
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<tr>
<td>T-MACH-102209</td>
<td>Information Engineering (S. 484)</td>
<td>3</td>
<td>Jivka Ovtcharova</td>
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<tr>
<td>T-MACH-105937</td>
<td>Information management in production (S. 485)</td>
<td>4</td>
<td>Oliver Riedel</td>
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</table>

Conditions
The course Product Lifecycle Management [2121350] is compulsory and has to be passed.
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students should:

- have basic knowledge about the challenges in product and process data management regarding the whole product lifecycle;
- have understanding about challenges and functional concepts of product lifecycle management;
- be able to operate common PLM systems.

Content
This module describes management and organizational approaches of Product Lifecycle Management, their application in IT and the potential benefits of PLM system solutions. Optional courses of this module introduce current product development processes in the scope of enterprise PLM system solutions.
Module: Rail System Technology [M-MACH-101274]

Responsibility: Peter Gratzfeld
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<tr>
<td>9</td>
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<td>1 semester</td>
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Compulsory

Identifier Course ECTS Responsibility
T-MACH-102143 Rail System Technology (S. 588) 9 Peter Gratzfeld

Learning Control / Examinations
The assessment is carried out as a general oral exam (45 min.) (according to Section 4(2), 2 of the examination regulation) of the single courses of this module. The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The overall grade of the module is the grade of the oral examination.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- They deduct the fundamental requirements for rail vehicles out of it and assess concepts of rail vehicles.
- They know about major systems in a rail vehicle and evaluate their fitness in specific fields of application.
- The students realize that the typical business model in railway industry is a project. They learn main features and characteristics of project management in this area.

Content
- Overview about fundamental components of a modern rail system (vehicles, infrastructure, operation)
- History and economic impact of rail systems
- Vehicle dynamics, wheel-rail-contact, train protection, traction power supply
- Main systems of rail vehicles (electric and non-electric traction drive, bogies, brakes)
- Vehicle concepts for mass transit and main line
- Main features and characteristics of project management in railway industry (project management system, organization, main processes)

Recommendations
The lectures can be taken simultaneously.

Workload
1. Regular attendance: 63 hours
2. Self-study: 63 hours
3. Exam and preparation: 144 hours
**Module: Specialization in Production Engineering [M-MACH-101284]**

**Responsibility:** Volker Schulze

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

**ECTS**

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<tr>
<td>T-MACH-102107</td>
<td>Quality Management (S. 587)</td>
<td>4</td>
<td>Gisela Lanza</td>
</tr>
<tr>
<td>T-MACH-105166</td>
<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry (S. 527)</td>
<td>4</td>
<td>Stefan Kienzle, Dieter Steegmüller</td>
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<tr>
<td>T-MACH-105177</td>
<td>Metal Forming (S. 534)</td>
<td>4</td>
<td>Florian Herlan</td>
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<tr>
<td>T-MACH-105185</td>
<td>Control Technology (S. 409)</td>
<td>4</td>
<td>Christoph Gönnheimer</td>
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<tr>
<td>T-MACH-102148</td>
<td>Gear Cutting Technology (S. 468)</td>
<td>4</td>
<td>Markus Klaiber</td>
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<tr>
<td>T-MACH-102189</td>
<td>Production Technology and Management in Automotive Industry (S. 579)</td>
<td>4</td>
<td>Volker Michael Stauch</td>
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<tr>
<td>T-MACH-105188</td>
<td>Integrative Strategies in Production and Development of High Performance Cars (S. 488)</td>
<td>4</td>
<td>Karl-Hubert Schlichtenmayer</td>
</tr>
</tbody>
</table>

**Qualification Objectives**

- besitzt grundlegende Kenntnisse über die industrielle Anwendung der Informationstechnologie im Gebiet der Produktentstehung,
- versteht die gegenwärtige und zukünftige Nutzung von Informationssystemen im Produktentstehungsprozess im Kontext des Product Lifecycle Managements und des Virtual Engineering,
- ist in der Lage, gängige CAx-und PLM-Systeme im Produktentstehungsprozess einzusetzen.

**Content**


**Remarks**

Module: Vehicle Development [M-MACH-101265]

Responsibility: Frank Gauterin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<tr>
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**Fahrzeugentwicklung**
Non-Compulsory Block; min. 9 ECTS

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<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I (S. 643)</td>
<td>3</td>
<td>Dieter Ammon</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-102207</td>
<td>Tires and Wheel Development for Passenger Cars (S. 640)</td>
<td>3</td>
<td>Günter Leister</td>
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<tr>
<td>T-MACH-105162</td>
<td>Fundamentals of Automobile Development I (S. 463)</td>
<td>1,5</td>
<td>Rolf Frech</td>
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<tr>
<td>T-MACH-105163</td>
<td>Fundamentals of Automobile Development II (S. 464)</td>
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<td>Rolf Frech</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
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<tr>
<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems (S. 615)</td>
<td>3</td>
<td>Marcus Geimer</td>
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**Learning Control / Examinations**
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.

**Conditions**
Successful passing of the corresponding modules of the basic program.

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

**Content**
See courses.

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

**Workload**
See German version.
10.3 Elective Module 2

10.3.1 Business Administration

**Module: CRM and Service Management [M-WIWI-101460]**

<table>
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<tr>
<th>Responsibility</th>
<th>Andreas Geyer-Schulz</th>
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<td>Organisation</td>
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**Identifier** | **Course** | **ECTS** | **Responsibility** |
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<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<td>T-WIWI-102595</td>
<td>Customer Relationship Management (S. 411)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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**Learning Control / Examinations**
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. Therby every lecture is examined by a written exam (according to Section 4(2), 1 of the examination regulation) and by successful completion of exercises (according to Section 4 (2), 3 of the examination regulation).

The grades of the individual lectures consists of the grade of the written exam (approximately 90 percent resp. 100 of 112 points) and of the exercise performance (approximately 10 percent resp. 12 of 112 points). In the case of passing the written exam (50 points) the points of the exercise performance will be added to the points of the written exam. 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.

**Conditions**
Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**
The following conditions must be met:


**Qualification Objectives**
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, ...).
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, ...).
Remarks
The lecture Customer Relationship Management [2540508] is given in English.
The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM is offered for a last time in the summer term 14. Details on the cycle and on the exams can be found on http://www.em.uni-karlsruhe.de/studies/.
Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Design, Construction and Sustainability Assessment of Buildings [M-WIWI-101467]

Responsibility: Thomas Lützkendorf
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

ECTS: 9
Recurrence: Each term
Duration: 2 semester
Level: 3

Compulsory

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<td>T-WIWI-102742</td>
<td>Design, Construction and Sustainability Assessment of Buildings I (S. 418)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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<tr>
<td>T-WIWI-102743</td>
<td>Design, Construction and Sustainability Assessment of Buildings II (S. 419)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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.

Recommendations
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.
Module: eBusiness and Service Management [M-WIWI-101434]

Responsibility: Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

ECTS Language Level
9 Deutsch 3

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
</tr>
<tr>
<td>T-WIWI-102598</td>
<td>Management of Business Networks (S. 516)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102706</td>
<td>Special Topics in Information Engineering &amp; Management (S. 623)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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 “Management of Business Networks”, “eFinance: Information engineering and management in finance” and “eServices” constitute three different application domains in which the basic principles of the Internet Economy are deepened. In the course
“Management of Business Networks” the focus is set on the strategic aspects of management and information systems. It is held in English and teaches parts of the syllabus with the support of a case study elaborated with Lecturers from Concordia University, Montreal, or if applicable, Rotterdam School of Management. Thus the matter of strategic enterprise networks, a.k.a. smart business networks is also analysed by employing an international perspective.

The course "eFinance: information engineering and management for securities tradingprovides 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 services.

The theoretic fundamentals of Information Engineering and Management 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 Engineering and Management.

**Remarks**

All practical Seminars offered at the IM can be chosen for Special Topics in Information Engineering & Management. Please update yourself on www.iism.kit.edu/im/lehre
Module: eFinance [M-WIWI-101402]

Responsibility: Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

Compulsory

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<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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Ergänzungsangebot
Non-Compulsory Block; min. 4,5, max. 4,5 ECTS

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<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
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<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
<td>1,5</td>
<td>Jörg Franke</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.
The course eFinance: Information Engineering and Management for Securities Trading [2540454] is compulsory and must be examined.

Modeled Conditions
The following conditions must be met:


Qualification Objectives
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.

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 supplemental 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.

Remarks

The current seminar courses for this semester, which are complementary to this module, are listed on the following webpage: the http://www.iism.kit.edu/im/lehre
Module: Energy Economics [M-WIWI-101464]

Responsibility: Wolf Fichtner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

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<tr>
<td>T-WIWI-102746</td>
<td>Introduction to Energy Economics (S. 493)</td>
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Ergänzungsangebot

Non-Compulsory Block; min. 3,5, max. 3,5 ECTS

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<tr>
<td>T-WIWI-100806</td>
<td>Renewable Energy-Resources, Technologies and Economics (S. 593)</td>
<td>3,5</td>
<td>Russell McKenna</td>
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<tr>
<td>T-WIWI-102607</td>
<td>Energy Policy (S. 436)</td>
<td>3,5</td>
<td>Martin Wietschel</td>
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Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.
The lecture Introduction into Energy Economics [2581010] has to be examined.

Modeled Conditions

The following conditions must be met:


Qualification Objectives

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.

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.)
Corporate Governance in Energy Economics: Challenges of the management of a large company in energy economics (superior leadership role, structures, processes and projects from a leadership perspective etc.)

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

Recommendations
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.

Remarks
Upon request, the authorisation for taking the examinations for modules of specialisation can be granted by the examination committee even if the mentioned conditions are not fulfilled. The approving statement of the coordinator of the module of specialisation claimed on the application form is not required for the module Energy Economics [TVWLIIP2]. The application form has to be submitted to the examination committee of the faculty along with a current transcript of records (e.g. via letterbox). Upon request at the institute, additional recognition of studies (e.g. from other universities) is possible in the module.

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

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration

Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<tr>
<td>T-WIWI-102604</td>
<td>Investments (S. 504)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102605</td>
<td>Financial Management (S. 450)</td>
<td>4,5</td>
<td>Martin Ruckes</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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

Responsibility: Martin Klarmann

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<td>T-WIWI-102805</td>
<td>Managing the Marketing Mix (S. 521)</td>
<td>4,5</td>
<td>Martin Klarmann</td>
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Ergänzungsangebot

Non-Compulsory Block; min. 4,5, max. 4,5 ECTS

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<td>T-WIWI-102798</td>
<td>Brand Management (S. 390)</td>
<td>4,5</td>
<td>Bruno Neibecker</td>
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<tr>
<td>T-WIWI-102806</td>
<td>Services Marketing and B2B Marketing (S. 612)</td>
<td>3</td>
<td>Martin Klarmann, Ju-Young Kim</td>
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<tr>
<td>T-WIWI-102807</td>
<td>International Marketing (S. 490)</td>
<td>1,5</td>
<td>Martin Klarmann</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

The course Marketing Mix is compulsory and must be examined.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
Ziel dieses Moduls ist es, Studierende auf eine Tätigkeit in Marketing oder Vertrieb vorzubereiten. Gerade in technisch orientierten Unternehmen werden hierfür gerne Mitarbeiter eingesetzt, die als Wirtschaftsingenieure oder Informationswirte auch selbst einen gewissen technischen Hintergrund haben.

Studierende
- kennen die wichtigsten Konzepte, Verfahren und Theorien der vier Instrumente des Marketing Mix (Produktmanagement, Preismanagement, Kommunikationsmanagement und Vertriebsmanagement)
- verfügen über das Wissen, Entscheidungen bezüglich der gegenwärtigen und zukünftigen Produkte (Produktinnovationen) zu treffen (z.B. mittels Conjoint-Analyse)
- wissen, wie Kunden Marken wahrnehmen und wie diese Wahrnehmung durch das Unternehmen beeinflusst werden kann
verstehen, wie Kunden auf Preise reagieren (z.B. mittels Preis-Absatz-Funktionen)
können Preise auf Basis konzeptioneller und quantitativer Überlegungen bestimmen
dienen die Grundlagen der Preisdifferenzierung
sind mit verschiedenen Instrumenten der Kommunikation vertraut (z.B. TV-Werbung) und können diese treffsicher gestalten
treffen Kommunikationsentscheidungen systematisch (z.B. mittels Mediaplanung)
dürfen den Markt segmentieren und das Produkt positionieren
wissen, wie die Wichtigkeit und Zufriedenheit von Kunden beurteilt werden können
dürfen die Beziehung zu Kunden und Vertriebspartnern gestalten
wissen um Besonderheiten des Marketing im Dienstleistungs- und B2B-Bereich
können die Besonderheiten des Marketing im internationalen Kontext

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 module in two ways:

- by choosing the course “Brand Management”.
- by choosing the combination of the courses “Services- and B2B-Marketing” and “International Marketing”.

Remarks
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.

Responsibility: Christof Weinhardt, Gerhard Satzger

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
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<tr>
<td>T-WIWI-105775</td>
<td>Foundations of Digital Services B (S. 454)</td>
<td>4,5</td>
<td>Stefan Nickel, Stefan Morana, Alexander Mädche</td>
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<tr>
<td>T-WIWI-105711</td>
<td>Practical Seminar Digital Services (S. 563)</td>
<td>4,5</td>
<td>Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Alexander Mädche, York Sure-Vetter, Gerhard Satzger</td>
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Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:


Qualification Objectives

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 an 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

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 pushes the 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.

**Recommendations**
None

**Remarks**
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.
**Compulsory Elective Module 2**

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

**Responsibility:** Petra Nieken  
**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Business Administration/Specialisation program  
Compulsory Elective Modules/Elective Module 1/Business Administration  
Compulsory Elective Modules/Elective Module 2/Business Administration  
Additional Examinations

**Compulsory**

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<td>Human Resource Management (S. 477)</td>
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**Ergänzungsangebot**  
Non-Compulsory Block; min. 4.5, max. 5.5 ECTS

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<td>T-WIWI-102908</td>
<td>Personnel Policies and Labor Market Institutions (S. 553)</td>
<td>4,5</td>
<td>Petra Nieken</td>
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<td>T-WIWI-102630</td>
<td>Managing Organizations (S. 520)</td>
<td>3,5</td>
<td>Hagen Lindstädt</td>
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<tr>
<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
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<td>Hagen Lindstädt</td>
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**Learning Control / Examinations**

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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

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

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

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.

**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.

**Recommendations**
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.
Module: Industrial Production I [M-WIWI-101437]

Responsibility: Frank Schultmann
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

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<tr>
<td>T-WIWI-102606</td>
<td>Fundamentals of Production Management (S. 466)</td>
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Ergänzungsangebot

Non-Compulsory Block; min. 3,5, max. 3,5 ECTS

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<td>Production Economics and Sustainability (S. 578)</td>
<td>3,5</td>
<td>Magnus Fröhling</td>
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<tr>
<td>T-WIWI-102870</td>
<td>Logistics and Supply Chain Management (S. 510)</td>
<td>3,5</td>
<td>Marcus Wiens</td>
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Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.
The course “Fundamentals of Production Management” [2581950] and one additional activity have to be chosen.

Modeled Conditions

The following conditions must be met:

Qualification Objectives

- 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.

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: Machine Learning for Finance and Data Science [M-WIWI-102753]**

**Responsibility:** Maxim Ulrich

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration

**Additional Examinations**

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-105712</td>
<td>Probabilistic Machine Learning for Finance and Data Science (S. 570)</td>
<td>4,5</td>
<td>Maxim Ulrich</td>
</tr>
<tr>
<td>T-WIWI-105714</td>
<td>Solving Finance Problems using Machine Learning (S. 621)</td>
<td>4,5</td>
<td>Maxim Ulrich</td>
</tr>
</tbody>
</table>

**Learning Control / Examinations**

The assessment is carried out as a module wide exam which itself consists of several partial exams (according to Section 4 (2), 1-3 SPO). A written exam at the end of the semester (120 min) (§4(2), 1 SPO) accounts for 50% of the module-wide grade. Students who have failed the first exam are allowed to retake the exam (during the 4th lecture free week in the same summer term). Another 25% of the module grade is accounted for by the submission of weekly programming problem sets (during the first half of the semester). The presentation and submission of a machine learning programming project (during the 2nd half of the semester) accounts for the final 25% of the module-wide grade. Interested students can in addition earn a “Seminarschein”.

**Conditions**

A formal prerequisite for taking this module is that students successfully complete all partial exams of the module wide exam within the same semester (only).

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

We put students into the shoes of a chief risk manager of a global quant asset management firm. Students first learn the most essential finance concepts such as Markowitz approach to portfolio management, the Capital Asset Pricing Model to determine cost of capital (and expected asset returns) of investments, linear factor models to predict expected returns and systematic and unsystematic risk of investments. After completion of this first couple of learning points, students learn modern machine learning tools to accomplish superior predictions for future returns and risks of different asset classes (such as equity, fixed-income, derivatives).

Upon completion of the module, students will have a conceptual, analytical and practical working knowledge of the following concepts and implemented these using Python:

1. Financial Concepts
   - A.1 Portfolio Management
     - Markowitz
     - Black-Litterman
   - A.2 Predicting an asset’s expected return
     - CAPM, Fama-French, linear factor models
     - Fama-MacBeth
     - ARMA modeling

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
- State Space modeling
A.3 Predicting an asset’s future risk
- ARCH/GARCH
- State Space modeling

1. Machine Learning concepts

B.1 ‘Supervised learning’ within linear and nonlinear models (e.g. least squares, maximum likelihood, Kalman Filter, MCMC)
B.2 ‘Unsupervised learning’ (e.g. PCA, SVD)

Content
This module provides a hands-on introduction to the use of machine learning for modeling financial markets. We will cover methods on how to predict asset returns, how to estimate the risk density of returns and respective risk premiums and how to build optimal portfolios. We will make use of modern statistical machine learning algorithms and test them rigorously with risk and asset management applications. The intuitive, yet analytical combination of machine learning on the one hand and financial applications on the other hand are a key feature of this module. The revealed knowledge will be useful for quantitative industry internships and jobs as well as for quantitative and/or data driven lectures, seminars and bachelor thesis at the FBV or other KIT institutes. In addition to studying the machine learning concepts, students receive numerous opportunities use modern machine learning software in order to solve current financial problems.

Recommendations
This module is self-contained. It is recommended that students have already heard other finance courses, although this is not a formal prerequisite. Students are assumed to have earned at least good grades during the KIT Bachelor’s math, stats, OR and IT courses.

Remarks
The courses of the module are held in English.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Management Accounting [M-WIWI-101498]

Responsibility: Marcus Wouters
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

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<tr>
<td>T-WIWI-102800</td>
<td>Management Accounting 1 (S. 513)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
</tr>
<tr>
<td>T-WIWI-102801</td>
<td>Management Accounting 2 (S. 514)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
</tr>
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</table>

Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

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

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

Remarks
Students who like this module are probably also interested in the courses

- 2530216 Financial Management
- 2530210 Management Accounting

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

Responsibility: Thomas Lützkendorf
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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 an procedures to problems within the real estate area.

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.

Recommendations
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.
Module: Risk and Insurance Management [M-WIWI-101436]

Responsibility: Ute Werner

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<th>Level</th>
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<tr>
<td>T-WIWI-102603</td>
<td>Principles of Insurance Management (S. 569)</td>
<td>4,5</td>
<td>Ute Werner</td>
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<tr>
<td>T-WIWI-102608</td>
<td>Enterprise Risk Management (S. 439)</td>
<td>4,5</td>
<td>Ute Werner</td>
</tr>
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</table>

Learning Control / Examinations

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 lectures are examined by oral presentations and related term papers in the context of the lectures. Furthermore, there is a final oral examination.

The grade of each examination consists of the oral presentation and the term paper (50 percent) and the oral examination (50 percent). 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.

Conditions

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:


Qualification Objectives

See German version.

Content

See German version.
Module: Specialization in Customer Relationship Management [M-WIWI-101422]

Responsibility: Andreas Geyer-Schulz
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

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<th>ECTS</th>
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<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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Ergänzungsangebot

Non-Compulsory Block; max. 1 Courses

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<th>ECTS</th>
<th>Responsibility</th>
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<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4,5</td>
<td>Kay Mitusch</td>
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<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
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</table>

Learning Control / Examinations
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, 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.

Conditions
Successful passing of the corresponding modules of the basic program.

- 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.
- At least, one of the courses Analytic CRM [2540522] and Operative CRM [2540520] has to be taken.

Modeled Conditions
The following conditions must be met:
1. Module [M-WIWI-101460] CRM and Service Management has to be started before taking this module.
2. Successful completion of module [M-WIWI-101494] Fundamentals of Business Administration 1 is required before taking this module.

Qualification Objectives
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.

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 (Extraction / Translation / Loading). The process of modelling a data-warehouse as well as the so-called extraction, translation, 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, ...)

Remarks
The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM is offered for a last time in the summer term 14. Details on

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Strategy and Organization [M-WIWI-101425]

Responsibility: Hagen Lindstädt
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration

**Compulsory Examinations**

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<tr>
<td>T-WIWI-102629</td>
<td>Management and Strategy (S. 515)</td>
<td>3.5</td>
<td>Hagen Lindstädt</td>
</tr>
<tr>
<td>T-WIWI-102630</td>
<td>Managing Organizations (S. 520)</td>
<td>3.5</td>
<td>Hagen Lindstädt</td>
</tr>
<tr>
<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
<td>2</td>
<td>Hagen Lindstädt</td>
</tr>
</tbody>
</table>

**Learning Control / Examinations**

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.

**Conditions**
Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**
The following conditions must be met:


**Qualification Objectives**
See German version.

**Content**

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
**Module: Supply Chain Management [M-WIWI-101421]**

**Responsibility:** Stefan Nickel

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

<table>
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<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<td>9</td>
<td>Each term</td>
<td>1 semester</td>
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**Wahlpflichtangebot**
Non-Compulsory Block; min. 1, max. 2 Courses

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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102598</td>
<td>Management of Business Networks (S. 516)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-102760</td>
<td>Management of Business Networks (Introduction) (S. 517)</td>
<td>3</td>
<td>Christof Weinhardt</td>
</tr>
</tbody>
</table>

**Ergänzungsangebot**
Non-Compulsory Block; max. 4 Courses

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<th>Identifier</th>
<th>Course Description</th>
<th>ECTS</th>
<th>Responsibility</th>
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</thead>
<tbody>
<tr>
<td>T-WIWI-103061</td>
<td>Prerequisite for Facility Location and Strategic Supply Chain Management (S. 565)</td>
<td></td>
<td>Stefan Nickel</td>
</tr>
<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-MACH-102089</td>
<td>Logistics - Organisation, Design and Control of Logistic Systems (S. 508)</td>
<td>6</td>
<td>Kai Furmans</td>
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</table>

**Learning Control / Examinations**
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.

**Conditions**
At least one of the courses Management of Business Networks [2590452] and Management of Business Networks (Introduction) [2540496] has to be taken.
Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**
The following conditions must be met:


**Qualification Objectives**
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

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 “Management of Business Networks” the focus is set on the strategic aspects of management and information systems. The course is held in English and teaches parts of the syllabus with the support of a case study elaborated with Prof Kersten from Concordia University, Montreal, Canada. The course MBN introduction is consisting out of the first part of the regular MBN lecture, but as it has less credits will not include the analysis of the case study.
The module is completed by an elective course addressing appropriate optimization methods for the Supply Chain Management and for modern logistic approaches.

Remarks
The planned lectures in the next terms can be found on the websites of the respective institutes IISM, IFL and IOR.
Module: Topics in Finance I [M-WIWI-101465]

 Responsibility: Marliese Uhrig-Homburg, Martin Ruckes
 Organisation: KIT-Fakultät für Wirtschaftswissenschaften
 Curricular Anchorage: Compulsory Elective
 Contained in: Business Administration/Specialisation program
 Compulsory Elective Modules/Elective Module 1/Business Administration
 Compulsory Elective Modules/Elective Module 2/Business Administration
 Additional Examinations

<table>
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<tr>
<td>T-WIWI-102623</td>
<td>Financial Intermediation (S. 449)</td>
<td>4,5</td>
<td>Martin Ruckes</td>
</tr>
<tr>
<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
<td>1,5</td>
<td>Jörg Franke</td>
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<tr>
<td>T-WIWI-102626</td>
<td>Business Strategies of Banks (S. 397)</td>
<td>3</td>
<td>Wolfgang Müller</td>
</tr>
<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102790</td>
<td>Specific Aspects in Taxation (S. 629)</td>
<td>4,5</td>
<td>Armin Bader, Berthold Wigger</td>
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<tr>
<td>T-WIWI-102879</td>
<td>Asset Management (S. 376)</td>
<td>3</td>
<td>Andreas Sauer</td>
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Learning Control / Examinations
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 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.

Conditions
Successful passing of the corresponding modules of the basic program.
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.

Modeled Conditions
The following conditions must be met:
3. Module [M-WIWI-101435] Essentials of Finance has to be started before taking this module.

Qualification Objectives
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

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.
Recommendations
None
Module: Topics in Finance II [M-WIWI-101423]

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<tr>
<td>T-WIWI-102623</td>
<td>Financial Intermediation (S. 449)</td>
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<td>Martin Ruckes</td>
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<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
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<td>Exchanges (S. 442)</td>
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<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102790</td>
<td>Specific Aspects in Taxation (S. 629)</td>
<td>4,5</td>
<td>Armin Bader, Berthold Wigger</td>
</tr>
<tr>
<td>T-WIWI-102879</td>
<td>Asset Management (S. 376)</td>
<td>3</td>
<td>Andreas Sauer</td>
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</table>

Learning Control / Examinations
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 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.

Conditions
Successful passing of the corresponding modules of the basic program.
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.

Modeled Conditions
The following conditions must be met:

3. Module [M-WIWI-101435] Essentials of Finance has to be started before taking this module.

Qualification Objectives
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

Remarks
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.
Workload
The total workload for this module is approximately 270 hours.
10.3.2 Economics

Module: Applied Microeconomics [M-WIWI-101499]

Responsibility: Johannes Philipp Reiß
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics

<table>
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<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-WIWI-102850</td>
<td>Introduction to Game Theory (S. 496)</td>
<td>4,5</td>
<td>Clemens Puppe, Johannes Philipp Reiß</td>
</tr>
<tr>
<td>T-WIWI-102844</td>
<td>Industrial Organization (S. 483)</td>
<td>4,5</td>
<td>Johannes Philipp Reiß</td>
</tr>
<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4,5</td>
<td>Kay Mitusch</td>
</tr>
<tr>
<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
<td>4,5</td>
<td>Berthold Wigger</td>
</tr>
<tr>
<td>T-WIWI-102876</td>
<td>Auction &amp; Mechanism Design (S. 377)</td>
<td>4,5</td>
<td>Nora Szech</td>
</tr>
<tr>
<td>T-WIWI-102892</td>
<td>Economics and Behavior (S. 421)</td>
<td>4,5</td>
<td>Nora Szech</td>
</tr>
<tr>
<td>T-WIWI-102792</td>
<td>Decision Theory (S. 415)</td>
<td>4,5</td>
<td>Karl-Martin Ehrhart</td>
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<td>T-WIWI-102736</td>
<td>Economics III: Introduction in Econometrics (S. 425)</td>
<td>5</td>
<td>Melanie Schienle</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
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”).

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.

Recommendations
Completion of the module Economics is assumed.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Economic Policy I [M-WIWI-101668]

Responsibility: Ingrid Ott

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics

Additional Examinations

<table>
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<th>Course</th>
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<th>Responsibility</th>
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<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4.5</td>
<td>Kay Mitsusch</td>
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<tr>
<td>T-WIWI-103213</td>
<td>Basic Principles of Economic Policy (S. 384)</td>
<td>4.5</td>
<td>Ingrid Ott</td>
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<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
<td>4.5</td>
<td>Berthold Wigger</td>
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</table>

Learning Control / Examinations

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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101398] Introduction to Economics is required before taking this module.

Qualification Objectives
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

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

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

Remarks

Workload
Total expenditure of time for 9 credits: 270 hours.
Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

The exact distribution is subject to the credits of the courses of the module.
Module: Economic Theory [M-WIWI-101501]

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics
Additional Examinations

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<tbody>
<tr>
<td>T-WIWI-102850</td>
<td>Introduction to Game Theory (S. 496)</td>
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<td>Clemens Puppe, Johannes Philipp Reiß</td>
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<tr>
<td>T-WIWI-102610</td>
<td>Welfare Economics (S. 649)</td>
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<td>T-WIWI-102844</td>
<td>Industrial Organization (S. 483)</td>
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<td>Johannes Philipp Reiß</td>
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<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory (S. 366)</td>
<td>4,5</td>
<td>Kay Mitusch, Marten Hillebrand</td>
</tr>
<tr>
<td>T-WIWI-102876</td>
<td>Auction &amp; Mechanism Design (S. 377)</td>
<td>4,5</td>
<td>Nora Szech</td>
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<tr>
<td>T-WIWI-102892</td>
<td>Economics and Behavior (S. 421)</td>
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<td>Nora Szech</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101398] Introduction to Economics is required before taking this module.

Qualification Objectives
See German version.

Recommendations
None
Module: Public Finance [M-WIWI-101403]

Responsibility: Berthold Wigger

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Economics/Specialisation program

Compulsory Elective Modules/Elective Module 2/Economics

Additional Examinations

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<tr>
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<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>1 semester</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<tbody>
<tr>
<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
<td>4.5</td>
<td>Berthold Wigger</td>
</tr>
<tr>
<td>T-WIWI-102790</td>
<td>Specific Aspects in Taxation (S. 629)</td>
<td>4.5</td>
<td>Armin Bader, Berthold Wigger</td>
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<tr>
<td>T-WIWI-102836</td>
<td>Monetary and Financial Policy (S. 541)</td>
<td>4.5</td>
<td>Joachim Nagel, Berthold Wigger</td>
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<tr>
<td>T-WIWI-102877</td>
<td>Monetary and Financial Policy (S. 542)</td>
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<td>Berthold Wigger</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

- Successful completion of module [M-WIWI-101398] Introduction to Economics is required before taking this module.

Qualification Objectives
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.

Recommendations
It is recommended to attend the course Spezielle Steuerlehre [2560129] after having completed the course Öffentliche Einnahmen [2560120].

Remarks
See German version.

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

Module: Electives in Informatics [M-WIWI-101426]

Responsibility: Rudi Studer, Hartmut Schmeck, Andreas Oberweis
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Compulsory Elective Modules/Elective Module 2/Informatics

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<th>Level</th>
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<tr>
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<td>Each term</td>
<td>1 semester</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 10 ECTS

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<tbody>
<tr>
<td>T-WIWI-102651</td>
<td>Applied Informatics II - IT Systems for eCommerce (S. 375)</td>
<td>5</td>
<td>Johann Marius Zöllner</td>
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<tr>
<td>T-WIWI-102652</td>
<td>Applied Informatics I - Modelling (S. 374)</td>
<td>5</td>
<td>Andreas Oberweis, York Sure-Vetter</td>
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<tr>
<td>T-WIWI-102910</td>
<td>Special Topics of Applied Informatics (S. 624)</td>
<td>5</td>
<td>Rudi Studer, Hartmut Schmeck, Andreas Oberweis</td>
</tr>
<tr>
<td>T-WIWI-102655</td>
<td>Efficient Algorithms (S. 426)</td>
<td>5</td>
<td>Hartmut Schmeck</td>
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<tr>
<td>T-WIWI-102658</td>
<td>Algorithms for Internet Applications (S. 368)</td>
<td>5</td>
<td>Hartmut Schmeck</td>
</tr>
<tr>
<td>T-WIWI-102660</td>
<td>Database Systems (S. 413)</td>
<td>5</td>
<td>Andreas Oberweis</td>
</tr>
<tr>
<td>T-WIWI-100809</td>
<td>Software Engineering (S. 618)</td>
<td>4</td>
<td>Andreas Oberweis</td>
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<tr>
<td>T-WIWI-102664</td>
<td>Knowledge Management (S. 506)</td>
<td>4</td>
<td>Rudi Studer</td>
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<tr>
<td>T-WIWI-104679</td>
<td>Foundations of mobile Business (S. 457)</td>
<td>5</td>
<td>Andreas Oberweis, Gunther Schiefer</td>
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</tbody>
</table>

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

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

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

Please note the following information about the module component exams of Prof. Dr. H. Schmeck:
- Algorithms for Internet Applications [T-WIWI-102658]: The examination will be offered latest until summer term 2017 (repeaters only).
- Efficient Algorithms [T-WIWI-102655]: The examination will be offered latest until winter term 2016/2017 (repeaters only).

Conditions
None

Qualification Objectives
The student
- knows and has mastered methods and systems for core topics and core application areas of computer science,
- can choose these methods and system situation adequately and can furthermore design and employ them for problem solving,
- is able to independently find strategic and creative answers in the finding of solutions to well defined, concrete, and abstract problems.

Content
The elective module conveys advanced knowledge in the area of applied computer science. This includes, for example, the efficient design and optimization of technical systems, the design and management of database applications or the systematic development of large software systems. Moreover, modeling of complex systems, the use of computer science methods to support knowledge management, and the design and implementation of service-oriented architectures are discussed in this module.
Workload
The total workload for this module is approximately 270 hours. For further information see German version.
10.3.4 Operations Research

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

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-103061</td>
<td>Prerequisite for Facility Location and Strategic Supply Chain</td>
<td>9</td>
<td>Stefan Nickel</td>
</tr>
<tr>
<td></td>
<td>Management (S. 565)</td>
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<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management</td>
<td>4,5</td>
<td>Stefan Nickel</td>
</tr>
<tr>
<td></td>
<td>(S. 443)</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td></td>
<td>Management (S. 568)</td>
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<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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**Wahlpflichtangebot**
Non-Compulsory Block; min. 1, max. 4 Courses

**Ergänzungsangebot**
Non-Compulsory Block; max. 1 Courses

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<tr>
<td>T-WIWI-102717</td>
<td>Software Laboratory: OR Models I (S. 619)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102726</td>
<td>Global Optimization I (S. 470)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-102627</td>
<td>Simulation I (S. 613)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
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</table>

**Learning Control / Examinations**
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.

**Conditions**
At least one of the courses *Facility Location and strategic Supply Chain Management* [2550486] and *Tactical and operational Supply Chain Management* [2550488] has to be taken. Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**
The following conditions must be met:
- Successful completion of module [M-WIWI-101418] *Introduction to Operations Research* is required before taking this module.

**Qualification Objectives**
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.

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.

Remarks
The planned lectures and courses for the next three years are announced online.
Module: Methodical Foundations of OR [M-WIWI-101414]

Responsibility: Oliver Stein
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective

<table>
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<th>Identifier</th>
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<tbody>
<tr>
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<td>Global Optimization I (S. 470)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-103062</td>
<td>Prerequisite for Nonlinear Optimization I (Bachelor)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-102724</td>
<td>Nonlinear Optimization I (S. 545)</td>
<td>4,5</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 1, max. 3 Courses

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<td>Global Optimization II (S. 472)</td>
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<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
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<tr>
<td>T-WIWI-102710</td>
<td>Markov Decision Models I (S. 523)</td>
<td>5</td>
<td>Karl-Heinz Waldmann</td>
</tr>
</tbody>
</table>

Ergänzungsangebot
Non-Compulsory Block; max. 1 Courses

Learning Control / Examinations
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.

Conditions
At least one of the lectures Nonlinear Optimization I [2550111] and Global Optimization I [2550134] has to be examined. Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101418] Introduction to Operations Research is required before taking this module.

Qualification Objectives
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.

Content
The module 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.

Remarks
The planned lectures and courses for the next three years are announced online (http://www.ior.kit.edu).
For the lectures of Prof. Stein a grade of 30% of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Stochastic Methods and Simulation [M-WIWI-101400]

Responsibility: Karl-Heinz Waldmann
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Operations Research/Specialisation program

<table>
<thead>
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<tbody>
<tr>
<td>T-WIWI-102710</td>
<td>Markov Decision Models I (S. 523)</td>
<td>5</td>
<td>Karl-Heinz Waldmann</td>
</tr>
<tr>
<td>T-WIWI-102627</td>
<td>Simulation I (S. 613)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
</tr>
</tbody>
</table>

Ergänzungsangebot
Non-Compulsory Block; max. 2 Courses

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<tbody>
<tr>
<td>T-WIWI-102711</td>
<td>Markov Decision Models II (S. 524)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
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<tr>
<td>T-WIWI-102703</td>
<td>Simulation II (S. 614)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
</tr>
<tr>
<td>T-WIWI-103062</td>
<td>Prerequisite for Nonlinear Optimization I (Bachelor) (S. 566)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
</tr>
<tr>
<td>T-WIWI-102724</td>
<td>Nonlinear Optimization I (S. 545)</td>
<td>4,5</td>
<td>Oliver Stein</td>
</tr>
<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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</table>

Learning Control / Examinations
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.

Conditions
At least one of the courses Markov Decision Models [2550679] or Simulation I [2550662] has to be attended. Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101418] Introduction to Operations Research is required before taking this module.

Qualification Objectives
The student possesses profound knowledge in modelling, analyzing and optimizing stochastic systems in economy and engineering.

Content
Markov Decision Models I: Markov Chains, Poisson Processes
Markov Decision Models II: Queuing Systems, Stochastic Decision Processes
Simulation I: Generation of random numbers, Monte Carlo integration, Discrete event simulation, Discrete and continuous random variables, Statistical analysis of simulated data.
Simulation II: Variance reduction techniques, Simulation of stochastic processes, Case studies.
Remarks
The planned lectures and courses for the next two years are announced online (http://www.ior.kit.edu/).
### Module: Automotive Engineering [M-MACH-101266]

**Responsibility:** Frank Gauterin  
**Organisation:** KIT-Fakultät für Maschinenbau  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Engineering Sciences/Specialisation program

**ECTS**
- **Recurrence:** Each term  
- **Duration:** 1 semester  
- **Level:** 3

**Fahrzeugtechnik**
Non-Compulsory Block; min. 9 ECTS

<table>
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<th>ECTS</th>
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<tbody>
<tr>
<td>T-MACH-100092</td>
<td>Automotive Engineering (S. 379)</td>
<td>6</td>
<td>Hans-Joachim Unrau, Frank Gauterin</td>
</tr>
<tr>
<td>T-MACH-102117</td>
<td>Automotive Engineering II (S. 381)</td>
<td>3</td>
<td>Hans-Joachim Unrau, Frank Gauterin</td>
</tr>
<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
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<tr>
<td>T-MACH-102116</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies I (S. 459)</td>
<td>1,5</td>
<td>Horst Dietmar Bardehle</td>
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<tr>
<td>T-MACH-102119</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies II (S. 460)</td>
<td>1,5</td>
<td>Horst Dietmar Bardehle</td>
</tr>
<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems (S. 451)</td>
<td>5</td>
<td>Stefan Haug, Martin Scherer, Marcus Geimer</td>
</tr>
<tr>
<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
<td>Marcus Geimer, Felix Weber</td>
</tr>
<tr>
<td>T-MACH-102203</td>
<td>Automotive Engineering I (S. 380)</td>
<td>6</td>
<td>Martin Gießler, Frank Gauterin</td>
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</table>

### Learning Control / Examinations

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.

### Conditions

Successful passing of the corresponding modules of the basic program.

### Modeled Conditions

The following conditions must be met:

2. Successful completion of module [M-MACH-101260] *Materials Science* is required before taking this module.

### Qualification Objectives

The student
- knows the most important components of a vehicle,
- knows and understands the functioning and the interaction of the individual components,
- knows the basics of dimensioning the components.
Content
See course descriptions.

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

Workload
See German version.
Module: Combustion Engines I [M-MACH-101275]

Responsibility: Heiko Kubach
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

<table>
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<tr>
<td>T-MACH-102194</td>
<td>Combustion Engines I (S. 400)</td>
<td>5</td>
<td>Thomas Koch, Heiko Kubach</td>
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<tr>
<td>T-MACH-105564</td>
<td>Energy Conversion and Increased Efficiency in Internal Combustion Engines (S. 434)</td>
<td>4</td>
<td>Thomas Koch, Heiko Kubach</td>
</tr>
</tbody>
</table>

Compulsory

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The student can name and explain the working principle of combustion engines. He is able to analyse and evaluate the combustion process. He is able to evaluate influences of gas exchange, mixture formation, fuels and exhaust gas aftertreatment on the combustion performance. He can solve basic research problems in the field of engine development. The student can name all important influences on the combustion process. He can analyse and evaluate the engine process considering efficiency, emissions and potential.

Content
Introduction, History, Concepts
Working Principle and Thermodynamics
Characteristic Parameters
Air Path
Fuel Path
Energy Conversion
Fuels
Emissions
Exhaust Gas Aftertreatment
Reaction kinetics
Gas exchange
Ignition
Flow field of gasoline engines
Working process
Pressure trace analysis
Thermodynamic analysis of the high pressure process
Exergy analysis and waste heat recuperation
Aspects of sustainability
**Module: Combustion Engines II [M-MACH-101303]**

**Responsibility:** Heiko Kubach

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

**Compulsory Elective Modules/Elective Module 1/Engineering Sciences**

**Compulsory Elective Modules/Elective Module 2/Engineering Sciences**

**Additional Examinations**

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**Compulsory**

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<tbody>
<tr>
<td>T-MACH-104609</td>
<td>Combustion Engines II (S. 401)</td>
<td>5</td>
<td>Heiko Kubach</td>
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**Verbrennungsmotoren II**

Non-Compulsory Block; min. 4 ECTS

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<tbody>
<tr>
<td>T-MACH-105044</td>
<td>Fundamentals of Catalytic Exhaust Gas Aftertreatment (S. 465)</td>
<td>4</td>
<td>Egbert Lox</td>
</tr>
<tr>
<td>T-MACH-105173</td>
<td>Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines (S. 370)</td>
<td>4</td>
<td>Marcus Gohl</td>
</tr>
<tr>
<td>T-MACH-105184</td>
<td>Fuels and Lubricants for Combustion Engines (S. 458)</td>
<td>4</td>
<td>Bernhard Kehrwald</td>
</tr>
<tr>
<td>T-MACH-105167</td>
<td>Analysis Tools for Combustion Diagnostics (S. 372)</td>
<td>4</td>
<td>Uwe Wagner</td>
</tr>
<tr>
<td>T-MACH-102197</td>
<td>Gas Engines (S. 467)</td>
<td>4</td>
<td>Rainer Golloch</td>
</tr>
<tr>
<td>T-MACH-102199</td>
<td>Model Based Application Methods (S. 539)</td>
<td>4</td>
<td>Frank Kirschbaum</td>
</tr>
<tr>
<td>T-MACH-105169</td>
<td>Engine Measurement Techniques (S. 437)</td>
<td>4</td>
<td>Sören Bernhardt</td>
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</table>

**Conditions**

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

The course Combustion Engines II [2134131] has to be attended.

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:

- Module [M-MACH-101275] Combustion Engines I has to be started before taking this module.

**Qualification Objectives**

See courses.


Module: Control Engineering [M-ETIT-101156]

Responsibility: Sören Hohmann, Mathias Kluwe
Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences

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<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tr>
<td>9</td>
<td>Each term</td>
<td>2 semester</td>
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Compulsory

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<tbody>
<tr>
<td>T-ETIT-100699</td>
<td>Modelling and Identification (S. 540)</td>
<td>4</td>
<td>Sören Hohmann</td>
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<tr>
<td>T-ETIT-101921</td>
<td>System Dynamics and Control Engineering (S. 636)</td>
<td>6</td>
<td>Sören Hohmann</td>
</tr>
</tbody>
</table>

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- get familiar with the basic concepts of control theory,
- learn and understand the elements, the structure and the behavior of dynamic systems,
- have insight in the problems of control and intuition about methods available to solve those problems as well in frequency domain as in time domain,
- get familiar with the basic principles and methods for the theoretical and experimental modelling of dynamic systems.

Content
This module familiarizes students with the basic elements, structures and the behavior of dynamic systems. Both time continuous and time discrete models are regarded. The students gain insight into the problems of control design and methods available to solve such problems in frequency and time domain. Above that, the students learn the basic principles and methods for the theoretical and experimental modelling of dynamic systems.
Module: Emphasis in Fundamentals of Engineering [M-MACH-101261]

Responsibility: Michael Hoffmann

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Vertiefung ingenieurwissenschaftlicher Grundlagen
Non-Compulsory Block; min. 9 ECTS

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<tr>
<td>T-ETIT-100534</td>
<td>Electrical Engineering for Business Engineers, Part II (S. 431)</td>
<td>5</td>
<td>Wolfgang Menesklou</td>
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<tr>
<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102210</td>
<td>Introduction to Engineering Mechanics II : Dynamics (S. 405)</td>
<td>5</td>
<td>Alexander Fidlin</td>
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</table>

Learning Control / Examinations
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 examinations take place at the beginning of the recess period. 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 removed from the average of the partial examinations, with at least two partial exams need to be.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Students acquire and deepen skills in engineering fundamentals and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.

Remarks
Starting winter term 2016/1017 the course “Introduction to Engineering Mechanics II : Dynamics” [2162276] will be held in winter term.

Workload
See German version.
Module: Emphasis Materials Science [M-MACH-101262]

Responsibility: Michael Hoffmann

Organisation: KIT-Fakultät für Maschinenbau

Curricular An-chorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

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Vertiefung Werkstoffkunde
Non-Compulsory Block; min. 9 ECTS

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<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102141</td>
<td>Constitution and Properties of Wear-resistant Materials (S. 406)</td>
<td>4</td>
<td>Sven Ulrich</td>
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<tr>
<td>T-MACH-100287</td>
<td>Introduction to Ceramics (S. 492)</td>
<td>6</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102102</td>
<td>Physical Basics of Laser Technology (S. 555)</td>
<td>5</td>
<td>Johannes Schneider</td>
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<td>T-MACH-102137</td>
<td>Polymer Engineering I (S. 559)</td>
<td>4</td>
<td>Peter Elsner</td>
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<td>T-MACH-102138</td>
<td>Polymer engineering II (S. 560)</td>
<td>4</td>
<td>Peter Elsner</td>
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<tr>
<td>T-MACH-102139</td>
<td>Failure of Structural Materials: Fatigue and Creep (S. 446)</td>
<td>4</td>
<td>Patric Gruber, Oliver Kraft, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102140</td>
<td>Failure of Structural Materials: Deformation and Fracture (S. 445)</td>
<td>4</td>
<td>Daniel Weygand, Oliver Kraft, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102157</td>
<td>High Performance Powder Metallurgy Materials (S. 476)</td>
<td>4</td>
<td>Rainer Oberacker</td>
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<tr>
<td>T-MACH-102179</td>
<td>Structural Ceramics (S. 635)</td>
<td>4</td>
<td>Michael Hoffmann</td>
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<td>T-MACH-102170</td>
<td>Structural and Phase Analysis (S. 634)</td>
<td>4</td>
<td>Susanne Wagner</td>
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<tr>
<td>T-MACH-100531</td>
<td>Systematic Materials Selection (S. 637)</td>
<td>5</td>
<td>Stefan Dietrich</td>
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Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Students acquire and deepen skills in fundamentals of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content
The module content depends on the elected courses.
Module: Energy Generation and Network Components [M-ETIT-101165]

Responsibility: Thomas Leibfried, Bernd Hoferer

Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

<table>
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<tbody>
<tr>
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<td>Each term</td>
<td>2 semester</td>
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Compulsory

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<tr>
<td>T-ETIT-101924</td>
<td>Power Generation (S. 561)</td>
<td>3</td>
<td>Bernd Hoferer</td>
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<tr>
<td>T-ETIT-101925</td>
<td>Design and Operation of Power Transformers (S. 417)</td>
<td>3</td>
<td>N. N., Mitarbeiter</td>
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<td>T-ETIT-101927</td>
<td>Automation of Power Grids (S. 378)</td>
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Learning Control / Examinations
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 examinations take place at the beginning of the recess period. 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 weighted average of the grades for each course and truncated after the first decimal.

Conditions
It is only possible to choose this module in combination with the module Power Networks [WW3INGETIT3]. The module is passed only after the final partial exam of Power Networks is additionally passed.

Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Module [M-ETIT-102379] Power Network has to be started before taking this module.

Qualification Objectives
The student
- has basic and advanced knowledge of electrical power engineering,
- is capable to analyse, calculate and develop electrical power engineering systems.

Content
The module deals with basic knowledge about the structure and operation of electrical power networks and their needed facilities. Further lectures give an insight into specific topics, such as Automation in electric power engineering or the procedures for generating electrical energy.

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

**Responsibility:**

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Engineering Sciences/Specialisation program  
Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
Compulsory Elective Modules/Elective Module 2/Engineering Sciences

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<td>T-ETIT-101924</td>
<td>Power Generation (S. 561)</td>
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<td>Bernd Hoferer</td>
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<td>T-MACH-100966</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (S. 386)</td>
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<td>T-MACH-100967</td>
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<td>Quality Management (S. 587)</td>
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<td>T-MACH-102176</td>
<td>Current Topics on BioMEMS (S. 410)</td>
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<tr>
<td>T-MACH-105234</td>
<td>Windpower (S. 680)</td>
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<td>Norbert Lewald</td>
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<td>T-BGU-100139</td>
<td>Hydro Power Engineering (S. 479)</td>
<td>6</td>
<td>Peter Oberle</td>
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</table>

**ECTS:** 9  
**Recurrence:** Once  
**Level:** 3

### Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

### Learning Control / Examinations

The assessment of the module is determined by the respective module coordinator. It can either be in the form of a general exam or partial exams, and must be contain at least 9 credit points and at least 6 hours per week. The examination may contain presentations, experiments, laboratories, term papers, etc. At least 50 percent of the module examination has to be in the form of a written or an oral examination (according to Section 4 (2), 1 or 2 of the examination regulation).

The formation of the overall grade of the module will be determined by the respective module coordinator.

### Conditions
See German version.

### Qualification Objectives
See German version.

### Content

Entsprechend dem interdisziplinären Profil des Studiengangs können technisch-orientierte Lehrveranstaltungen zu einem außerplanmäßigen Ingenieurmodul zusammengestellt werden, die nicht oder nicht in dieser Kombination im Modulhandbuch des Studiengangs aufgeführt sind. Die im außerplanmäßigen Ingenieurmodul zusammengestellten technisch-orientierten Lehrveranstaltungen umfassen dabei in Summe mindestens 9 LP und mindestens 6 SWS.

Zunehmend bieten ingenieurwissenschaftliche Fakultäten Lehrveranstaltungen mit nicht technischem, meist wirtschaftswissenschaftlichem Bezug an. Diese aus ingenieurwissenschaftlicher Sicht sinnvolle Ergänzung zur technischen Ausbildung ihrer Studierenden, ist für die Studiengänge der Fakultät für Wirtschaftswissenschaften nicht geeignet. Daher genehmigt der Prüfungsausschuss solche Lehrveranstaltungen grundsätzlich nicht im Rahmen der zu erwerbenden 9 LP des außerplanmäßigen Ingenieurmoduls. Wer dennoch solche Lehrveranstaltungen in die Fachprüfung Ingenieurwissenschaften integrieren möchte, kann – in Übereinstimmung mit dem zuständigen Prüfer - ein Modul zusammenstellen, das dann entsprechend mehr Leistungspunkte umfassen muss.

### Remarks

Die oben stehende Aufstellung ist nicht vollständig, sonderndenthält nur eine Auswahl möglicher Teilleistungen. Die Liste wird
fortlaufend aktualisiert. Wie oben beschrieben kann das außerplanmäßige Ingenieurmodul auf genehmigungspflichtigen Antrag individuell zusammengestellt werden.
Neben den 9 LP müssen mindestens 6 Semesterwochenstunden erbracht werden.
Es kann maximal ein außerplanmäßiges Ingenieurmodul abgelegt werden.
### Module: Fundamentals of construction [M-BGU-101004]

**Responsibility:** Shervin Haghsheno  
**Organisation:** KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:**  
- Engineering Sciences/Specialisation program  
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
- Additional Examinations

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<tr>
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#### Compulsory

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<tr>
<td>T-BGU-101675</td>
<td>Project Management (S. 581)</td>
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#### Conditions
Successful passing of the corresponding modules of the basic program.

#### Qualification Objectives

- The student is familiar with all substantial domains of construction  
- knows and understands substantial construction methods and construction machines  
- masters basic construction calculations  
- knows and understands the fundamentals of project management in civil engineering  

The student can apply his / her knowledge in a goal-oriented manner to accomplish a construction project efficiently.

#### Content

Courses of this module comprise methods and machines from all construction domains. Specifically, the module covers production planning as well as substantial parts of structural engineering and underground engineering, including auxiliary systems. In addition to the explanation of fundamentals, machines, and methods the courses include performance calculations. Further, students receive an introduction to project management in civil engineering which includes project phases, project organization, and the columns of project management which are schedule management, cost management, and quality management.

#### Remarks

We encourage students to deepen their knowledge in construction by building additional customized modules from the courses offered by TMB. Please consult with the tutors of this module. Further information is available at www.tmb.kit.edu.
Module: Handling Characteristics of Motor Vehicles [M-MACH-101264]

Responsibility: Frank Gauterin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<td>T-MACH-105155</td>
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<td>T-MACH-102177</td>
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<td>4</td>
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Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] Materials Science is required before taking this module.

Qualification Objectives
The student
- knows and understands the characteristics of vehicles, owing to the construction and design tokens,
- knows and understands especially the factors being relevant for comfort and acoustics
- is capable of fundamentally evaluating and rating handling characteristics.

Content
See courses.
Recommendations

Workload
See German Version.
Module: Integrated Production Planning [M-MACH-101272]

Responsibility: Volker Schulze
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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Compulsory

Identifier Course ECTS Responsibility
T-MACH-102106 Integrated Production Planning (S. 487) 9 Gisela Lanza

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning they have learned about to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.

Content
Within this engineering sciences-oriented module the students will get to learn principle aspects of organization and planning of production systems. Further information can be found at the description of the lecture “Integrated Production Planning”.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Natural Hazards and Risk Analysis 1 [M-WIWI-101646]

Responsibility: Michael Kunz

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

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<th>Language</th>
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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 12 ECTS

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<td>T-BGU-101693</td>
<td>Hydrology (S. 480)</td>
<td>4</td>
<td>Erwin Zehe</td>
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<td>T-BGU-101667</td>
<td>Hydraulic Engineering and Water Management (S. 478)</td>
<td>4</td>
<td>Franz Nestmann</td>
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<tr>
<td>T-BGU-101636</td>
<td>Remote Sensing, exam (S. 592)</td>
<td>4</td>
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<tr>
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<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 497)</td>
<td>3</td>
<td>Sven Wursthorn, Norbert Rösch</td>
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<tr>
<td>T-BGU-103541</td>
<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 498)</td>
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<td>T-PHYS-105954</td>
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<td>T-BGU-101814</td>
<td>Project in Applied Remote Sensing (S. 580)</td>
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Learning Control / Examinations
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.

Conditions
There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

Qualification Objectives
See German version

Content
See German version

Recommendations
The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Natural Hazards and Risk Analysis 2 [M-WIWI-101648]

Responsibility: Michael Kunz

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

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<td>9</td>
<td>Each term</td>
<td>1 Semester</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 12 ECTS

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<tr>
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<td>T-BGU-101637</td>
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Learning Control / Examinations
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.

Conditions
There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it is not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

Modeled Conditions
The following conditions must be met:
- Module [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1 has to be started before taking this module.

Qualification Objectives
See German version

Content
See German version

Recommendations
The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination
for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

**Remarks**
Students, who successfully completed both modules Introduction to Natural Hazards and Risk Analysis 1/2 (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Technical Logistics [M-MACH-101269]

Responsibility: Kai Furmans
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<td>T-MACH-102128</td>
<td>Information Systems and Supply Chain Management (S. 486)</td>
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<td>T-WIWI-103091</td>
<td>Production and Logistics Controlling (S. 577)</td>
<td>3</td>
<td>Helmut Wlcek</td>
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</table>

Conditions
Successful passing of the corresponding modules of the basic program.
One of the core courses Material Flow in Logistic Systems [2117051] or Basics of Technical Logistics [2117095] or Elements and systems of Technical Logistics [2117096] is mandatory. Elements and systems of Technical Logistics is only allowed to be examined after Basics of Technical Logistics is passed successfully in this or an other module. For simultaneous attending of both courses, examination dates are sequenced accordingly.

Qualification Objectives
The student acquires
- well-founded knowledge and method knowledge in the main topics of technical logistics,
- expertise and understanding about the functionality of conveyor technology,
- ability for modeling logistic systems with adequate accuracy by using simple models,
- ability to evaluate logistic systems and to identify cause-and-effects-chains within logistic systems.

Content
The module Introduction to Technical Logistics provides first insights into main topics of technical logistics. Within the lectures, the interaction between several components of material handling systems will be clarified. The focus will be on technical characteristics...
of material handling technology and basics for sizing of material handling systems. To gain a deeper understanding, the course is accompanied by exercises and further improved by case studies.
### Module: Introduction to Track Guided Transport Systems [M-BGU-102283]

**Responsibility:** Eberhard Hohnecker

**Organisation:** KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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<tr>
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**Compulsory**

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<tr>
<td>T-BGU-104580</td>
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<td>Eberhard Hohnecker</td>
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</table>

**Conditions**

Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.
### Module: Machine Tools and Industrial Handling [M-MACH-101286]

**Responsibility:** Jürgen Fleischer  
**Organisation:** KIT-Fakultät für Maschinenbau  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Engineering Sciences/Specialisation program, Compulsory Elective Modules/Elective Module 1/Engineering Sciences, Compulsory Elective Modules/Elective Module 2/Engineering Sciences, Additional Examinations

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<th>Responsibility</th>
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<tr>
<td>T-MACH-102158</td>
<td>Machine Tools and Industrial Handling (S. 511)</td>
<td>9</td>
<td>Jürgen Fleischer</td>
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</table>

**Conditions**  
Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**  
The students
- are capable to explain the use and application of machine tools and handling devices as well as differentiate their characteristics and structure.  
- are able to name and describe the essential components (frame, main spindles, feed axis, peripheral equipment, control) of machine tools.  
- are capable to distinguish and select and describe the essential components regarding structure, characteristics advantages and disadvantages.  
- are enabled to dimension the main components of machine tools.  
- are able to name and describe the control principles of machine tools.  
- are capable to name examples of machine tools and industrial handling as well as to deduce compare the essential components. Additionally they can allocate manufacturing processes.  
- are enabled to identify drawbacks as well as derive and assess measures for improvements.  
- are qualified to apply methods for selection and evaluation of machine tools.  
- are experienced to deduce the particular failure characteristics of a ball screw.

**Content**  
The module overviews the assembly, dimensioning and application of machine tools and industrial handling. A consolidated and practice oriented knowledge is imparted about the choice, dimensioning and assessment of production machines. At first, the major components of machine tools are explained systematically. At this, the characteristics of dimensioning of machine tools are described in detail. Finally, the application of machine tools is demonstrated by means of example machines of the manufacturing processes turning, milling, grinding, massive forming, sheet metal forming and tothing.
### Module: Manufacturing Technology [M-MACH-101276]

**Responsibility:** Volker Schulze  
**Organisation:** KIT-Fakultät für Maschinenbau  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
Additional Examinations

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**Compulsory**

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<tr>
<td>T-MACH-102105</td>
<td>Manufacturing Technology (S. 522)</td>
<td>9</td>
<td>Frederik Zanger, Volker Schulze</td>
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</tbody>
</table>

**Conditions**  
Successful passing of the corresponding modules of the basic program.

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

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

**Workload**  
The total workload for this module is approximately 270 hours. For further information see German version.
### Module: Microsystem Technology [M-MACH-101287]

**Responsibility:** Volker Saile

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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<tr>
<td>T-MACH-105182</td>
<td>Introduction to Microsystem Technology I (S. 499)</td>
<td>3</td>
<td>Jan Gerrit Korvink, Andreas Guber</td>
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<tr>
<td>T-MACH-105183</td>
<td>Introduction to Microsystem Technology II (S. 500)</td>
<td>3</td>
<td>Andreas Guber</td>
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<tr>
<td>T-MACH-102164</td>
<td>Practical Training in Basics of Microsystem Technology (S. 564)</td>
<td>3</td>
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<tr>
<td>T-MACH-100530</td>
<td>Physics for Engineers (S. 556)</td>
<td>6</td>
<td>Alexander Nesterov-Müller, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102165</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 597)</td>
<td>3</td>
<td>Timo Mappes</td>
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<tr>
<td>T-MACH-100967</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 387)</td>
<td>3</td>
<td>Andreas Guber</td>
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<tr>
<td>T-MACH-100968</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 388)</td>
<td>3</td>
<td>Andreas Guber</td>
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<tr>
<td>T-MACH-101910</td>
<td>Microactuators (S. 536)</td>
<td>3</td>
<td>Manfred Kohl</td>
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<tr>
<td>T-MACH-102152</td>
<td>Novel Actuators and Sensors (S. 548)</td>
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<td>Manfred Kohl, Martin Sommer</td>
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<td>T-MACH-102080</td>
<td>Nanotechnology with Clusterbeams (S. 543)</td>
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<td>Jürgen Gspann</td>
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<tr>
<td>T-MACH-102172</td>
<td>Bionics for Engineers and Natural Scientists (S. 389)</td>
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<td>Hendrik Hölzschere</td>
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<td>T-ETIT-101907</td>
<td>Optoelectronic Components (S. 550)</td>
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**Compulsory**

**Wahlpflichtangebot**

Non-Compulsory Block; min. 5 ECTS

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<td>Optoelectronic Components (S. 550)</td>
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<td>Wolfgang Freude</td>
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</table>

**Conditions**
Successful passing of the corresponding modules of the basic program.
This module cannot be combined with the module Microsystem Technology in the Master studies.
The course Basics of microsystemtechnology I [2141861] is compulsory and must be examined.

**Qualification Objectives**
- construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

**Content**
The module offers courses in microsystem technology. Knowledge is imparted in various fields like basics in construction and production of e. g. mechanical, optical, fluidic and sensory microsystems.

**Remarks**
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.
Module: Mobile Machines [M-MACH-101267]

Responsibility: Marcus Geimer
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Mobile Arbeitsmaschinen
Non-Compulsory Block; min. 9 ECTS

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<tbody>
<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems (S. 451)</td>
<td>5</td>
<td>Stefan Haug, Martin Scherer, Marcus Geimer</td>
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<tr>
<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems (S. 615)</td>
<td>3</td>
<td>Marcus Geimer</td>
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<tr>
<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
<td>Marcus Geimer, Felix Weber</td>
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<tr>
<td>T-MACH-105168</td>
<td>Mobile Machines (S. 537)</td>
<td>9</td>
<td>Marcus Geimer</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
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</table>

Learning Control / Examinations
The assessment is carried out as a general oral exam (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.
The examination is offered every semester. Re-examinations are offered at every ordinary examination date.
The overall grade of the module is the grade of the oral examination.
The assessment may be carried out as partial oral exams (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. In this case the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.
The assessment procedures are described for each course of the module separately.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] Materials Science is required before taking this module.

Qualification Objectives
The student
- knows and understands the basic structure of the machines
- masters the basic skills to develop the selected machines

Content
In the module of Mobile Machines [WI4INGMB15] the students will learn the structure of the machines and deepen the knowledge of the subject for developing the machines. After conclusion the module the student will know the latest developments in mobile
machines and is able to evaluate the concepts and the trends of developments. The module is practically orientated and supported by industry partners.

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Mobility and Infrastructure [M-BGU-101067]

Responsibility: Ralf Roos
Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<tr>
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Compulsory

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<tr>
<td>T-BGU-101791</td>
<td>Mobility and Infrastructure (S. 538)</td>
<td>9</td>
<td>Ralf Roos</td>
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</table>

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Learning the fundamental terminology and methodology of spatial and transportation planning, traffic engineering as well as highway engineering

Content
Basic tasks and contents of different planning levels, for example: Land use and conflicts, provision of services and infrastructure as well as their costs, planning on local, regional, national and European level.

Fundamentals of transportation planning (convention for analyses, surveys of travel behaviour), fundamentals of traffic engineering

Design Basics in Highway Engineering: Road network layout, driving dynamics, principles of highway design; earthworks, pavements and their dimensioning
Module: Power Network [M-ETIT-102379]

**Responsibility:** Thomas Leibfried, Bernd Hoferer

**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

### Compulsory

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<td>T-ETIT-101923</td>
<td>Electric Energy Systems (S. 429)</td>
<td>5</td>
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<td>Thomas Leibfried</td>
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<td>Power Network (S. 562)</td>
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**Conditions**

Successful passing of the corresponding modules of the basic program.
Module: Product Lifecycle Management [M-MACH-101270]

Responsibility: Jivka Ovtcharova

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

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<td>T-MACH-105147</td>
<td>Product Lifecycle Management (S. 575)</td>
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Non-Compulsory Block; min. 3 ECTS

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<tr>
<td>T-MACH-102125</td>
<td>Computer Integrated Planning of New Products (S. 405)</td>
<td>4</td>
<td>Roland Kläger</td>
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<tr>
<td>T-MACH-102153</td>
<td>PLM-CAD Workshop (S. 558)</td>
<td>4</td>
<td>Jivka Ovtcharova</td>
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<tr>
<td>T-MACH-102181</td>
<td>PLM for Product Development in Mechatronics (S. 557)</td>
<td>4</td>
<td>Martin Eigner</td>
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<tr>
<td>T-MACH-102209</td>
<td>Information Engineering (S. 484)</td>
<td>3</td>
<td>Jivka Ovtcharova</td>
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<tr>
<td>T-MACH-105937</td>
<td>Information management in production (S. 485)</td>
<td>4</td>
<td>Oliver Riedel</td>
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</table>

Conditions

The course Product Lifecycle Management [2121350] is compulsory and has to be passed. Successful passing of the corresponding modules of the basic program.

Qualification Objectives

The students should:

- have basic knowledge about the challenges in product and process data management regarding the whole product lifecycle;
- have understanding about challenges and functional concepts of product lifecycle management;
- be able to operate common PLM systems.

Content

This module describes management and organizational approaches of Product Lifecycle Management, their application in IT and the potential benefits of PLM system solutions. Optional courses of this module introduce current product development processes in the scope of enterprise PLM system solutions.
Module: Rail System Technology [M-MACH-101274]

Responsibility: Peter Gratzfeld
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

Recurrence
Duration
Level
ECTS
Each winter term
1 semester
3

Identifier Course ECTS Responsibility
T-MACH-102143 Rail System Technology (S. 588) 9 Peter Gratzfeld

Learning Control / Examinations
The assessment is carried out as a general oral exam (45 min.) (according to Section 4(2), 2 of the examination regulation) of the single courses of this module. The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The overall grade of the module is the grade of the oral examination.

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- They deduct the fundamental requirements for rail vehicles out of it and assess concepts of rail vehicles.
- They know about major systems in a rail vehicle and evaluate their fitness in specific fields of application.
- The students realize that the typical business model in railway industry is a project. They learn main features and characteristics of project management in this area.

Content
- Overview about fundamental components of a modern rail system (vehicles, infrastructure, operation)
- History and economic impact of rail systems
- Vehicle dynamics, wheel-rail-contact, train protection, traction power supply
- Main systems of rail vehicles (electric and non-electric traction drive, bogies, brakes)
- Vehicle concepts for mass transit and main line
- Main features and characteristics of project management in railway industry (project management system, organization, main processes)

Recommendations
The lectures can be taken simultaneously.

Workload
1. Regular attendance: 63 hours
2. Self-study: 63 hours
3. Exam and preparation: 144 hours
### Module: Specialization in Production Engineering [M-MACH-101284]

**Responsibility:** Volker Schulze  
**Organisation:** KIT-Fakultät für Maschinenbau  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:**  
- Engineering Sciences/Specialisation program  
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
- Additional Examinations

**ECTS**  
**Recurrence**  
**Duration**

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<tr>
<td>T-MACH-102107</td>
<td>Quality Management (S. 587)</td>
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<td>Gisela Lanza</td>
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<tr>
<td>T-MACH-105166</td>
<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry (S. 527)</td>
<td>4</td>
<td>Stefan Kienzle, Dieter Steegmüller</td>
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<tr>
<td>T-MACH-105177</td>
<td>Metal Forming (S. 534)</td>
<td>4</td>
<td>Florian Herlan</td>
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<tr>
<td>T-MACH-105185</td>
<td>Control Technology (S. 409)</td>
<td>4</td>
<td>Christoph Gönnheimer</td>
</tr>
<tr>
<td>T-MACH-102148</td>
<td>Gear Cutting Technology (S. 468)</td>
<td>4</td>
<td>Markus Klaiber</td>
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<tr>
<td>T-MACH-102189</td>
<td>Production Technology and Management in Automotive Industry (S. 579)</td>
<td>4</td>
<td>Volker Michael Stauch</td>
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<tr>
<td>T-MACH-105188</td>
<td>Integrative Strategies in Production and Development of High Performance Cars (S. 488)</td>
<td>4</td>
<td>Karl-Hubert Schlichenmayer</td>
</tr>
</tbody>
</table>

### Qualification Objectives

Der/ die Studierende  
- besitzt grundlegende Kenntnisse über die industrielle Anwendung der Informationstechnologie im Gebiet der Produktentste- 
  hung,  
- versteht die gegenwärtige und zukünftige Nutzung von Informationssystemen im Produktentstehungsprozess im Kontext des 
  Product Lifecycle Managements und des Virtual Engineering,  
- ist in der Lage, gängige Cax-und PLM-Systeme im Produktentstehungsprozess einzusetzen.

### Content

Dieses Modul vermittelt eine integrative lebenszyklusorientierte Betrachtung von Produkten und Prozessen. Beschrieben werden 
- die globale Verteilung von Entwicklung, Fertigung und Vertrieb, sowie die Erschließung der Potenziale des Einsatzes neuer im-
  mersiver, interaktiver und intelligenter Technologien (Virtual Reality, Augmented Reality, Mixed Reality, Virtual Mock-Up) für 
  funktionsbezogene Validierungstätigkeiten im Kontext des gesamten Produktes.

### Remarks

Das Modul kann nicht mehr neu belegt werden. Studierende, die das Modul bereits begonnen haben, können dies noch unter den 
alten Bedingungen bis zum WS2011/12 abschließen oder sich auf schriftlichen Antrag beim Studienbüro auf eines der Nachfolge-
Module: Vehicle Development [M-MACH-101265]

Responsibility: Frank Gauterin

Organisation: KIT-Fakultät für Maschinenbau

Curricular An- chorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

<table>
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<th>Level</th>
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Fahrzeugentwicklung
Non-Compulsory Block; min. 9 ECTS

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<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I (S. 643)</td>
<td>3</td>
<td>Dieter Ammon</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
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<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-102207</td>
<td>Tires and Wheel Development for Passenger Cars (S. 640)</td>
<td>3</td>
<td>Günter Leister</td>
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<tr>
<td>T-MACH-105162</td>
<td>Fundamentals of Automobile Development I (S. 463)</td>
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<td>Rolf Frech</td>
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<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
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<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems (S. 615)</td>
<td>3</td>
<td>Marcus Geimer</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

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

Content
See courses.

Recommendations

Workload
See German version.
### 10.3.6 Statistics

**Module: Statistics and Econometrics [M-WIWI-101599]**

- **Responsibility:** Melanie Schienle, Oliver Grothe
- **Organisation:** KIT-Fakultät für Wirtschaftswissenschaften
- **Curricular Anchorage:** Compulsory Elective
- **Contained in:** Compulsory Elective Modules/Elective Module 2/Statistics

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**Compulsory**

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<tr>
<td>T-WIWI-102736</td>
<td>Economics III: Introduction in Econometrics (S. 425)</td>
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**Ergänzungsangebot**

Non-Compulsory Block, min. 4, max. 5 ECTS

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<td>Analysis of multivariate Data (S. 371)</td>
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<td>Financial Econometrics (S. 448)</td>
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<td>Statistical Modeling of generalized regression models (S. 630)</td>
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<td>Data Mining and Applications (S. 412)</td>
<td>4,5</td>
<td>Rheza Nakhaeizadeh</td>
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**Learning Control / Examinations**

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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

The course „Economics III: Introduction in Econometrics“ is compulsory and must be examined. In case the course „Economics III: Introduction in Econometrics“ has already been examined within the module „Applied Microeconomics“, the course „Economics III: Introduction in Econometrics“ is not compulsory.

**Modeled Conditions**

The following conditions must be met:
- Successful completion of module [M-WIWI-101432] *Introduction to Statistics* is required before taking this module.

**Qualification Objectives**

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.

**Content**

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

**Workload**

The total workload for this module is approximately 270 hours.
10.3.7 Law

Module: Elective Module Law [M-INFO-101187]

Responsibility: Thomas Dreier
Organisation: KIT-Fakultät für Informatik
Curricular Anchorage: Compulsory Elective
Contained in: Compulsory Elective Modules/Elective Module 2/Law

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Compulsory

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<td>Public Law II (S. 585)</td>
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<td>T-INFO-103339</td>
<td>Civil Law for Beginners (S. 398)</td>
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Learning Control / Examinations
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place in 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.

Conditions
None

Qualification Objectives
Der/die Studierende
- besitzt grundlegende juristische Kenntnisse des Zivilrechts, des Handels- und Gesellschaftsrechts sowie des Öffentlichen Rechts,
- ist in der Lage, juristische Fragestellungen zu erkennen, juristisch zu kommunizieren und einfache Rechtsfragen selbständig zu lösen sowie bei komplexeren rechtlichen Fragestellungen den externen Beratungsbedarf zu erkennen und zu formulieren,
- beherrscht die juristische Falllösungsmethode der Subsumtion in Grundzügen und kann sie zur Lösung konkreter Streitfragen einsetzen.

Content

Behandelt werden im Zivilrecht u.a. der allgemeine Teil des BGB, das allgemeine und das besondere Schuldrecht sowie Grundzüge des Sachenrechts; im Handels- und Gesellschaftsrecht die Kaufmannseigenschaft, Formen der handelsrechtlichen Stellvertretung und der Handelsgeschäfte einschließlich der Hauptformen der Personen- und der Kapitalgesellschaften sowie im öffentlichen Recht die Grundrechte, das Staatsorganisationsrecht, das Verwaltungsrecht und der verfassungs- und verwaltungsgerichtliche Rechtsschutz.

Workload
See German version.
10.3.8 Sociology

Module: Sociology/Empirical Social Research [M-GEISTSOZ-101167]

Responsibility: Gerd Nollmann
Organisation: KIT-Fakultät für Geistes- und Sozialwissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Compulsory Elective Modules/Elective Module 2/Sociology

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<td>Projectseminar (S. 583)</td>
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Conditions
None

Qualification Objectives
The student
- Gains theoretical and methodical knowledge of social processes and structures
- Is able to apply acquired knowledge practically
- Is able to present work results in a precise and clear way

Content
This module offers students the possibility to get to know research problems and to answer these theoretically as well as empirically. For example: Who does earn how much in his job and why? How do subcultures emerge? Why are boys’ grades in school always worse than those of girls? Do divorces have negative influences on the development of children? How does mass consumption influence the individual? Is there a world society emerging?

In addition, this module contains courses on sociological methods that are essential to answer the above questions scientifically.
11 Additional Examinations

Module: Additional Examinations [M-WIWI-101981]

Responsibility:
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Additional Examinations

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Zusatzleistungen
Non-Compulsory Block; min. 30 ECTS

Conditions
None
### Module: Applications of Operations Research [M-WIWI-101413]

**Responsibility:** Stefan Nickel

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Operations Research/Specialisation program

#### Additional Examinations

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#### Wahlpflichtangebot

Non-Compulsory Block; min. 1, max. 4 Courses

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<td>T-WIWI-103061</td>
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<td>Stefan Nickel</td>
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<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
<td>4,5</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
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#### Ergänzungsangebot

Non-Compulsory Block; max. 1 Courses

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<td>Software Laboratory: OR Models I (S. 619)</td>
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<td>Global Optimization I (S. 470)</td>
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<td>Simulation I (S. 613)</td>
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#### Learning Control / Examinations

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.

#### Conditions

At least one of the courses *Facility Location and strategic Supply Chain Management* [2550486] and *Tactical and operational Supply Chain Management* [2550488] has to be taken.

Successful passing of the corresponding modules of the basic program.

#### Modeled Conditions

The following conditions must be met:

- Successful completion of module [M-WIWI-101418] *Introduction to Operations Research* is required before taking this module.

#### Qualification Objectives

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.

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.

Remarks
The planned lectures and courses for the next three years are announced online.
## Module: Applied Microeconomics [M-WIWI-101499]

### Responsibility:
Johannes Philipp Reiß

### Organisation:
KIT-Fakultät für Wirtschaftswissenschaften

### Curricular Anchorage:
Compulsory Elective

### Contained in:
- Economics/Specialisation program
- Compulsory Elective Modules/Elective Module 2/Economics
- Additional Examinations

### Additional Examinations

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<td>9</td>
<td>Each term</td>
<td>1 Semester</td>
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### Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<td>4,5</td>
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<td>T-WIWI-102844</td>
<td>Industrial Organization (S. 483)</td>
<td>4,5</td>
<td>Johannes Philipp Reiß</td>
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<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4,5</td>
<td>Kay Mitusch</td>
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<tr>
<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
<td>4,5</td>
<td>Berthold Wigger</td>
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<tr>
<td>T-WIWI-102876</td>
<td>Auction &amp; Mechanism Design (S. 377)</td>
<td>4,5</td>
<td>Nora Szech</td>
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<tr>
<td>T-WIWI-102892</td>
<td>Economics and Behavior (S. 421)</td>
<td>4,5</td>
<td>Nora Szech</td>
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<tr>
<td>T-WIWI-102792</td>
<td>Decision Theory (S. 415)</td>
<td>4,5</td>
<td>Karl-Martin Ehrhart</td>
</tr>
<tr>
<td>T-WIWI-102736</td>
<td>Economics III: Introduction in Econometrics (S. 425)</td>
<td>5</td>
<td>Melanie Schienle</td>
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</table>

### Learning Control / Examinations

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.

### Conditions
Successful passing of the corresponding modules of the basic program.

### Qualification Objectives

#### 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”).

### 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.

### Recommendations

Completion of the module Economics is assumed.

### Workload

The total workload for this module is approximately 270 hours. For further information see German version.
### Module: Automotive Engineering [M-MACH-101266]

**Responsibility:** Frank Gauterin  
**Organisation:** KIT-Fakultät für Maschinenbau  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:**  
- Engineering Sciences/Specialisation program  
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences  
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences  
- Additional Examinations

<table>
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<tbody>
<tr>
<td>T-MACH-100092</td>
<td>Automotive Engineering (S. 379)</td>
<td>6</td>
<td>Hans-Joachim Unrau, Frank Gauterin</td>
</tr>
<tr>
<td>T-MACH-102117</td>
<td>Automotive Engineering II (S. 381)</td>
<td>3</td>
<td>Hans-Joachim Unrau, Frank Gauterin</td>
</tr>
<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
</tr>
<tr>
<td>T-MACH-102116</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies I (S. 459)</td>
<td>1,5</td>
<td>Horst Dietmar Bardehle</td>
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<tr>
<td>T-MACH-102119</td>
<td>Fundamentals for Design of Motor-Vehicle Bodies II (S. 460)</td>
<td>1,5</td>
<td>Horst Dietmar Bardehle</td>
</tr>
<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems (S. 451)</td>
<td>5</td>
<td>Stefan Haug, Martin Scherer, Marcus Geimer</td>
</tr>
<tr>
<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
<td>Marcus Geimer, Felix Weber</td>
</tr>
<tr>
<td>T-MACH-102203</td>
<td>Automotive Engineering I (S. 380)</td>
<td>6</td>
<td>Martin Gießler, Frank Gauterin</td>
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</table>

**Non-Compulsory Block; min. 9 ECTS**

### Learning Control / Examinations

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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:

2. Successful completion of module [M-MACH-101260] *Materials Science* is required before taking this module.

**Qualification Objectives**

The student

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

**Content**

See course descriptions.
Recommendations
Knowledge of the content of the courses *Engineering Mechanics I* [2161238] and *Engineering Mechanics II* [1262276] is helpful.

Workload
See German version.
**Module: Combustion Engines I [M-MACH-101275]**

**Responsibility:** Heiko Kubach

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

<table>
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<tbody>
<tr>
<td>9</td>
<td>Each winter term</td>
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**Compulsory**

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<tr>
<td>T-MACH-102194</td>
<td>Combustion Engines I (S. 400)</td>
<td>5</td>
<td>Thomas Koch, Heiko Kubach</td>
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<tr>
<td>T-MACH-105564</td>
<td>Energy Conversion and Increased Efficiency in Internal Combustion Engines (S. 434)</td>
<td>4</td>
<td>Thomas Koch, Heiko Kubach</td>
</tr>
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</table>

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**

The student can name and explain the working principle of combustion engines. He is able to analyse and evaluate the combustion process. He is able to evaluate influences of gas exchange, mixture formation, fuels and exhaust gas aftertreatment on the combustion performance. He can solve basic research problems in the field of engine development. The student can name all important influences on the combustion process. He can analyse and evaluate the engine process considering efficiency, emissions and potential.

**Content**

- Introduction, History, Concepts
- Working Principle and Thermodynamics
- Characteristic Parameters
- Air Path
- Fuel Path
- Energy Conversion
- Fuels
- Emissions
- Exhaust Gas Aftertreatment
- Reaction kinetics
- Gas exchange
- Ignition
- Flow field of gasoline engines
- Working process
- Pressure trace analysis
- Thermodynamic analysis of the high pressure process
- Exergy analysis and waste heat recuperation
- Aspects of sustainability
Module: Combustion Engines II [M-MACH-101303]

Responsibility: Heiko Kubach

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

**Compulsory**

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<tr>
<td>T-MACH-104609</td>
<td>Combustion Engines II (S. 401)</td>
<td>5</td>
<td>Heiko Kubach</td>
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**Verbrennungsmotoren II**
Non-Compulsory Block; min. 4 ECTS

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<tr>
<td>T-MACH-105044</td>
<td>Fundamentals of Catalytic Exhaust Gas Aftertreatment (S. 465)</td>
<td>4</td>
<td>Egbert Lox</td>
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<tr>
<td>T-MACH-105173</td>
<td>Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines (S. 370)</td>
<td>4</td>
<td>Marcus Gohl</td>
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<tr>
<td>T-MACH-105184</td>
<td>Fuels and Lubricants for Combustion Engines (S. 458)</td>
<td>4</td>
<td>Bernhard Kehrwald</td>
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<tr>
<td>T-MACH-105167</td>
<td>Analysis Tools for Combustion Diagnostics (S. 372)</td>
<td>4</td>
<td>Uwe Wagner</td>
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<tr>
<td>T-MACH-102197</td>
<td>Gas Engines (S. 467)</td>
<td>4</td>
<td>Rainer Golloch</td>
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<tr>
<td>T-MACH-102199</td>
<td>Model Based Application Methods (S. 539)</td>
<td>4</td>
<td>Frank Kirschbaum</td>
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<tr>
<td>T-MACH-105169</td>
<td>Engine Measurement Techniques (S. 437)</td>
<td>4</td>
<td>Sören Bernhardt</td>
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</table>

**Conditions**

It is only possible to choose this module in combination with the module Combustion Engines I. The module is passed only after the final partial exam of Combustion Engines I is additionally passed. The course Combustion Engines II [2134131] has to be attended. Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:
- Module [M-MACH-101275] Combustion Engines I has to be started before taking this module.

**Qualification Objectives**

See courses.
Module: CRM and Service Management [M-WIWI-101460]

Responsibility: Andreas Geyer-Schulz

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

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<tr>
<td>9</td>
<td>Each term</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 2, max. 2 Courses

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<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102595</td>
<td>Customer Relationship Management (S. 411)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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</table>

Learning Control / Examinations
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. Therby every lecture is examined by a written exam (according to Section 4(2), 1 of the examination regulation) and by successful completion of exercises (according to Section 4 (2), 3 of the examination regulation).
The grades of the individual lectures consists of the grade of the written exam (approximately 90 percent resp. 100 of 112 points) and of the exercise performance (approximately 10 percent resp. 12 of 112 points). In the case of passing the written exam (50 points) the points of the exercise performance will be added to the points of the written exam. 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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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, ...).

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, ...).

Remarks

The lecture Customer Relationship Management [2540508] is given in English.
The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM is offered for a last time in the summer term 14. Details on the cycle and on the exams can be found on http://www.em.uni-karlsruhe.de/studies/.

Workload

The total workload for this module is approximately 270 hours. For further information see German version.
### Module: Design, Construction and Sustainability Assessment of Buildings [M-WIWI-101467]

**Responsibility:** Thomas Lützkendorf  
**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:**  
- Business Administration/Specialisation program  
- Compulsory Elective Modules/Elective Module 1/Business Administration  
- Compulsory Elective Modules/Elective Module 2/Business Administration  
- Additional Examinations

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<th>Duration</th>
<th>Level</th>
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<tbody>
<tr>
<td>9</td>
<td>Each term</td>
<td>2 semester</td>
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#### Compulsory

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<th>ECTS</th>
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<tbody>
<tr>
<td>T-WIWI-102742</td>
<td>Design, Construction and Sustainability Assessment of Buildings I (S. 418)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
</tr>
<tr>
<td>T-WIWI-102743</td>
<td>Design, Construction and Sustainability Assessment of Buildings II (S. 419)</td>
<td>4,5</td>
<td>Thomas Lützkendorf</td>
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</table>

#### Learning Control / Examinations

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.

#### Conditions

Successful passing of the corresponding modules of the basic program.

#### Modeled Conditions

The following conditions must be met:


#### Qualification Objectives

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.

#### 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.

#### Recommendations

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.
Module: eBusiness and Service Management [M-WIWI-101434]

Responsibility: Christof Weinhardt
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program

<table>
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<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
</tr>
<tr>
<td>T-WIWI-102598</td>
<td>Management of Business Networks (S. 516)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
</tr>
<tr>
<td>T-WIWI-102706</td>
<td>Special Topics in Information Engineering &amp; Management (S. 623)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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 “Management of Business Networks”, “eFinance: Information engineering and management in finance” and “eServices” constitute three different application domains in which the basic principles of the Internet Economy are deepened. In the course
"Management of Business Networks" the focus is set on the strategic aspects of management and information systems. It is held in English and teaches parts of the syllabus with the support of a case study elaborated with Lecturers from Concordia University, Montreal, or if applicable, Rotterdam School of Management. Thus the matter of strategic enterprise networks, a.k.a. smart business networks is also analysed by employing an international perspective.

The course "eFinance: information engineering and management 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 services.

The theoric fundamentals of Information Engineering and Management 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 Engineering and Management.

Remarks
All practical Seminars offered at the IM can be chosen for Special Topics in Information Engineering & Management. Please update yourself on www.iism.kit.edu/im/lehre
Module: Economic Policy I [M-WIWI-101668]

Responsibility: Ingrid Ott
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics
Additional Examinations

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

<table>
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<tr>
<th>Identifier</th>
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<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
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<tr>
<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4,5</td>
<td>Each term</td>
<td>1 Semester</td>
<td>Deutsch</td>
</tr>
<tr>
<td>T-WIWI-103213</td>
<td>Basic Principles of Economic Policy (S. 384)</td>
<td>4,5</td>
<td>Each term</td>
<td>1 Semester</td>
<td>Deutsch</td>
</tr>
<tr>
<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
<td>4,5</td>
<td>Each term</td>
<td>1 Semester</td>
<td>Deutsch</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101398] Introduction to Economics is required before taking this module.

Qualification Objectives
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

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

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

Remarks

Workload
Total expenditure of time for 9 credits: 270 hours.
11 ADDITIONAL EXAMINATIONS

Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

The exact distribution is subject to the credits of the courses of the module.
Module: Economic Theory [M-WIWI-101501]

Responsibility: Clemens Puppe

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular An-chorage: Compulsory Elective

Contained in: Economics/Specialisation program
Compulsory Elective Modules/Elective Module 2/Economics
Additional Examinations

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<td>2 semester</td>
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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

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<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102850</td>
<td>Introduction to Game Theory (S. 496)</td>
<td>4,5</td>
<td>Clemens Puppe, Johannes Philipp Reiß</td>
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<tr>
<td>T-WIWI-102610</td>
<td>Welfare Economics (S. 649)</td>
<td>4,5</td>
<td>Clemens Puppe</td>
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<td>T-WIWI-102844</td>
<td>Industrial Organization (S. 483)</td>
<td>4,5</td>
<td>Johannes Philipp Reiß</td>
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<tr>
<td>T-WIWI-102609</td>
<td>Advanced Topics in Economic Theory (S. 366)</td>
<td>4,5</td>
<td>Kay Mitusch, Marten Hillebrand</td>
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<tr>
<td>T-WIWI-102876</td>
<td>Auction &amp; Mechanism Design (S. 377)</td>
<td>4,5</td>
<td>Nora Szech</td>
</tr>
<tr>
<td>T-WIWI-102892</td>
<td>Economics and Behavior (S. 421)</td>
<td>4,5</td>
<td>Nora Szech</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101398] Introduction to Economics is required before taking this module.

Qualification Objectives
See German version.

Recommendations
None
Module: eFinance [M-WIWI-101402]

Responsibility: Christof Weinhardt

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

Compulsory Elective Modules/Elective Module 1/Business Administration

Compulsory Elective Modules/Elective Module 2/Business Administration

Additional Examinations

<table>
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<th>Duration</th>
<th>Level</th>
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<tr>
<td>9</td>
<td>Each term</td>
<td>2 semester</td>
<td>3</td>
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Compulsory

**Identifier** | **Course** | **ECTS** | **Responsibility** |
---|---|---|---|
T-WIWI-102600 | eFinance: Information Engineering and Management for Securities Trading (S. 427) | 4,5 | Christof Weinhardt |

Ergänzungsangebot

Non-Compulsory Block; min. 4,5, max. 4,5 ECTS

<table>
<thead>
<tr>
<th>Identifier</th>
<th><strong>Course</strong></th>
<th><strong>ECTS</strong></th>
<th><strong>Responsibility</strong></th>
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<tr>
<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
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<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
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<td>Jörg Franke</td>
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Learning Control / Examinations

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.

Conditions

Successful passing of the corresponding modules of the basic program.
The course *eFinance: Information Engineering and Management for Securities Trading* [2540454] is compulsory and must be examined.

Modeled Conditions

The following conditions must be met:


Qualification Objectives

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.

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.

Remarks
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
### Module: Electives in Informatics [M-WIWI-101630]

**Responsibility:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Additional Examinations

### ECTS Recurrence Duration

- **9** Each term 1 semester

### Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 10 ECTS

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<tr>
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<tr>
<td>T-WIWI-102658</td>
<td>Algorithms for Internet Applications (S. 368)</td>
<td>5</td>
<td>Hartmut Schmeck</td>
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<tr>
<td>T-WIWI-102759</td>
<td>Requirements Analysis and Requirements Management (S. 594)</td>
<td>4</td>
<td>Ralf Kneuper</td>
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<td>T-WIWI-102651</td>
<td>Applied Informatics II - IT Systems for eCommerce (S. 375)</td>
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<td>Johann Marius Zöllner</td>
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<td>T-WIWI-102680</td>
<td>Computational Economics (S. 403)</td>
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<td>Database Systems and XML (S. 414)</td>
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<td>Stefan Klink</td>
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<td>Thomas Wolf</td>
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<td>Pradyumn Kumar Shukla</td>
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<tr>
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<td>Organic Computing (S. 551)</td>
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<td>Hartmut Schmeck</td>
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<tr>
<td>T-WIWI-102874</td>
<td>Semantic Web Technologies (S. 598)</td>
<td>5</td>
<td>Rudi Studer, Andreas Harth</td>
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<tr>
<td>T-WWII-105801</td>
<td>Service Oriented Computing (S. 611)</td>
<td>5</td>
<td>Barry Norton, Sudhir Agarwal, Rudi Studer</td>
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<tr>
<td>T-WIWI-102845</td>
<td>Smart Energy Distribution (S. 616)</td>
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<td>Hartmut Schmeck</td>
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<td>T-WIWI-102895</td>
<td>Software Quality Management (S. 620)</td>
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<td>T-WIWI-102676</td>
<td>Special Topics of Enterprise Information Systems (S. 626)</td>
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<td>Andreas Oberweis</td>
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<td>T-WIWI-102657</td>
<td>Special Topics of Efficient Algorithms (S. 625)</td>
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<td>Hartmut Schmeck</td>
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<td>T-WIWI-102678</td>
<td>Special Topics of Software- and Systemsengineering (S. 628)</td>
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<td>Andreas Oberweis</td>
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<td>T-WIWI-102671</td>
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<td>T-WIWI-103523</td>
<td>Advanced Lab Informatics (S. 361)</td>
<td>4</td>
<td>Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner</td>
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</table>
Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every single partial exam the respective minimum requirements has to be achieved.

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

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

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

Algorithms for Internet Applications [T-WIWI-102658]: The examination will be offered latest until summer term 2017 (repeaters only).
Computational Economics [T-WIWI-102680]: The examination will be offered latest until summer term 2017 (repeaters only).
Efficient Algorithms [T-WIWI-102655]: The examination will be offered latest until winter term 2016/2017 (repeaters only).
Nature-Inspired Optimization Methods Optimierungsverfahren [T-WIWI-102679]: The examination will be offered latest until winter term 2017/2018 (repeaters only).
Organic Computing [T-WIWI-102659]: The examination will be offered latest until winter term 2016/2017 (repeaters only).
Smart Energy Distribution [T-WIWI-102845]: The examination will be offered latest until winter term 2016/2017 (repeaters only).

Conditions
None.

Qualification Objectives
The student

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

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

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

**Module: Emphasis in Fundamentals of Engineering [M-MACH-101261]**

**Responsibility:** Michael Hoffmann

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

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Vertiefung ingenieurwissenschaftlicher Grundlagen
Non-Compulsory Block; min. 9 ECTS

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<tr>
<td>T-ETIT-100534</td>
<td>Electrical Engineering for Business Engineers, Part II (S. 431)</td>
<td>5</td>
<td>Wolfgang Menesklou</td>
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<tr>
<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<tr>
<td>T-MACH-102210</td>
<td>Introduction to Engineering Mechanics II : Dynamics (S. 405)</td>
<td>5</td>
<td>Alexander Fidlin</td>
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**Learning Control / Examinations**
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 examinations take place at the beginning of the recess period. 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 removed from the average of the partial examinations, with at least two partial exams need to be.

**Conditions**
Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**
Students acquire and deepen skills in engineering fundamentals and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

**Content**
The module content depends on the elected courses.

**Remarks**
Starting winter term 2016/1017 the course “Introduction to Engineering Mechanics II : Dynamics” [2162276] will be held in winter term.

**Workload**
See German version.
## Module: Emphasis in Informatics [M-WIWI-101628]

**Responsibility:** Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Additional Examinations

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### Wahlpflichtangebot

Non-Compulsory Block; min. 9, max. 10 ECTS

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<tr>
<td>T-WIWI-102658</td>
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<td>T-WIWI-102759</td>
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<td>Special Topics of Enterprise Information Systems (S. 626)</td>
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Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every single partial exam the respective minimum requirements has to be achieved.

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

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

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

- **Algorithms for Internet Applications** [T-WIWI-102658]: The examination will be offered latest until summer term 2017 (repeaters only).
- **Computational Economics** [T-WIWI-102680]: The examination will be offered latest until summer term 2017 (repeaters only).
- **Efficient Algorithms** [T-WIWI-102655]: The examination will be offered latest until winter term 2016/2017 (repeaters only).
- **Nature-Inspired Optimization Methods Optimierungsverfahren** [T-WIWI-102679]: The examination will be offered latest until winter term 2017/2018 (repeaters only).
- **Organic Computing** [T-WIWI-102659]: The examination will be offered latest until winter term 2016/2017 (repeaters only).
- **Smart Energy Distribution** [T-WIWI-102845]: The examination will be offered latest until winter term 2016/2017 (repeaters only).

Conditions
None.

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

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Emphasis Materials Science [M-MACH-101262]

Responsibility: Michael Hoffmann

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

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Vertiefung Werkstoffkunde

Non-Compulsory Block; min. 9 ECTS

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<td>T-MACH-102079</td>
<td>Material Science II for Business Engineers (S. 526)</td>
<td>5</td>
<td>Michael Hoffmann</td>
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<td>T-MACH-102141</td>
<td>Constitution and Properties of Wear-resistant Materials (S. 406)</td>
<td>4</td>
<td>Sven Ulrich</td>
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<td>T-MACH-100287</td>
<td>Introduction to Ceramics (S. 492)</td>
<td>6</td>
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<tr>
<td>T-MACH-102102</td>
<td>Physical Basics of Laser Technology (S. 555)</td>
<td>5</td>
<td>Johannes Schneider</td>
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<td>T-MACH-102137</td>
<td>Polymer Engineering I (S. 559)</td>
<td>4</td>
<td>Peter Elsner</td>
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<tr>
<td>T-MACH-102138</td>
<td>Polymer Engineering II (S. 560)</td>
<td>4</td>
<td>Peter Elsner</td>
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<td>T-MACH-102139</td>
<td>Failure of Structural Materials: Fatigue and Creep (S. 446)</td>
<td>4</td>
<td>Patric Gruber, Oliver Kraft, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102140</td>
<td>Failure of Structural Materials: Deformation and Fracture (S. 445)</td>
<td>4</td>
<td>Daniel Weygand, Oliver Kraft, Peter Gumbsch</td>
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<tr>
<td>T-MACH-102157</td>
<td>High Performance Powder Metallurgy Materials (S. 476)</td>
<td>4</td>
<td>Rainer Oberacker</td>
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<tr>
<td>T-MACH-102179</td>
<td>Structural Ceramics (S. 635)</td>
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<td>T-MACH-102170</td>
<td>Structural and Phase Analysis (S. 634)</td>
<td>4</td>
<td>Susanne Wagner</td>
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<td>T-MACH-100531</td>
<td>Systematic Materials Selection (S. 637)</td>
<td>5</td>
<td>Stefan Dietrich</td>
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</table>

Conditions

Successful passing of the corresponding modules of the basic program.

Qualification Objectives

Students acquire and deepen skills in fundamentals of materials science and engineering and can apply them to technical problems. Specific teaching objectives are agreed with the respective coordinator of the course.

Content

The module content depends on the elected courses.
Module: Energy Economics [M-WIWI-101464]

Responsibility: Wolf Fichtner
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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Compulsory

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<tr>
<td>T-WIWI-102746</td>
<td>Introduction to Energy Economics (S. 493)</td>
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<td>Wolf Fichtner</td>
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Ergänzungsangebot
Non-Compulsory Block; min. 3,5, max. 3,5 ECTS

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<tr>
<td>T-WIWI-100806</td>
<td>Renewable Energy-Resources, Technologies and Economics (S. 593)</td>
<td>3,5</td>
<td>Russell McKenna</td>
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<tr>
<td>T-WIWI-102607</td>
<td>Energy Policy (S. 436)</td>
<td>3,5</td>
<td>Martin Wietschel</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.
The lecture Introduction into Energy Economics [2581010] has to be examined.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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.)
Corporate Governance in Energy Economics: Challenges of the management of a large company in energy economics (superior leadership role, structures, processes and projects from a leadership perspective etc.)

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

Recommendations
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.

Remarks
Upon request, the authorisation for taking the examinations for modules of specialisation can be granted by the examination committee even if the mentioned conditions are not fulfilled. The approving statement of the coordinator of the module of specialisation claimed on the application form is not required for the module Energy Economics [TVWLIIP2]. The application form has to be submitted to the examination committee of the faculty along with a current transcript of records (e.g. via letterbox). Upon request at the institute, additional recognition of studies (e.g. from other universities) is possible in the module.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Energy Generation and Network Components [M-ETIT-101165]

Responsibility: Thomas Leibfried, Bernd Hoferer

Organisation: KIT-Fakultät für Elektrotechnik und Informationstechnik

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<tr>
<td>T-ETIT-101924</td>
<td>Power Generation (S. 561)</td>
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<td>Bernd Hoferer</td>
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<tr>
<td>T-ETIT-101925</td>
<td>Design and Operation of Power Transformers (S. 417)</td>
<td>3</td>
<td>N. N., Mitarbeiter</td>
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<td>T-ETIT-101927</td>
<td>Automation of Power Grids (S. 378)</td>
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Learning Control / Examinations

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 examinations take place at the beginning of the recess period. 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 weighted average of the grades for each course and truncated after the first decimal.

Conditions

It is only possible to choose this module in combination with the module Power Networks [WW3INGETIT3]. The module is passed only after the final partial exam of Power Networks is additionally passed.

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:

- Module [M-ETIT-102379] Power Network has to be started before taking this module.

Qualification Objectives

The student

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

Content

The module deals with basic knowledge about the structure and operation of electrical power networks and their needed facilities. Further lectures give an insight into specific topics, such as Automation in electric power engineering or the procedures for generating electrical energy.

Workload

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

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<tr>
<td>T-WIWI-102604</td>
<td>Investments (S. 504)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102605</td>
<td>Financial Management (S. 450)</td>
<td>4,5</td>
<td>Martin Ruckes</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
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.

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

Responsibility: Martin Klarmann
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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Compulsory

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<td>T-WIWI-102805</td>
<td>Managing the Marketing Mix (S. 521)</td>
<td>4,5</td>
<td>Martin Klarmann</td>
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Ergänzungsangebot
Non-Compulsory Block; min. 4,5, max. 4,5 ECTS

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<tr>
<td>T-WIWI-102798</td>
<td>Brand Management (S. 390)</td>
<td>4,5</td>
<td>Bruno Neibecker</td>
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<tr>
<td>T-WIWI-102806</td>
<td>Services Marketing and B2B Marketing (S. 612)</td>
<td>3</td>
<td>Martin Klarmann, Ju-Young Kim</td>
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<tr>
<td>T-WIWI-102807</td>
<td>International Marketing (S. 490)</td>
<td>1,5</td>
<td>Martin Klarmann</td>
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</table>

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.
The course Marketing Mix is compulsory and must be examined.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
Ziel dieses Moduls ist es, Studierende auf eine Tätigkeit in Marketing oder Vertrieb vorzubereiten. Gerade in technisch orientierten Unternehmen werden hierfür gerne Mitarbeiter eingesetzt, die als Wirtschaftsingenieure oder Informationswirte auch selbst einen gewissen technischen Hintergrund haben.

Studierende
- kennen die wichtigsten Konzepte, Verfahren und Theorien der vier Instrumente des Marketing Mix (Produktmanagement, Preismanagement, Kommunikationsmanagement und Vertriebsmanagement)
- verfügen über das Wissen, Entscheidungen bezüglich der gegenwärtigen und zukünftigen Produkte (Produktinnovationen) zu treffen (z.B. mittels Conjoint-Analyse)
- wissen, wie Kunden Marken wahrnehmen und wie diese Wahrnehmung durch das Unternehmen beeinflusst werden kann.
ADDITIONAL EXAMINATIONS

- verstehen, wie Kunden auf Preise reagieren (z.B. mittels Preis-Absatz-Funktionen)
- können Preise auf Basis konzeptioneller und quantitativer Überlegungen bestimmen
- kennen die Grundlagen der Preisdifferenzierung
- sind mit verschiedenen Instrumenten der Kommunikation vertraut (z.B. TV-Werbung) und können diese treffsicher gestalten
- treffen Kommunikationsentscheidungen systematisch (z.B. mittels Mediaplanung)
- können den Markt segmentieren und das Produkt positionieren
- wissen, wie die Wichtigkeit und Zufriedenheit von Kunden beurteilt werden können
- können die Beziehung zu Kunden und Vertriebspartnern gestalten
- wissen um Besonderheiten des Marketing im Dienstleistungs- und B2B-Bereich
- kennen die Besonderheiten des Marketing im internationalen Kontext

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 module in two ways:
- by choosing the course “Brand Management”.
- by choosing the combination of the courses “Services- and B2B-Marketing” and “International Marketing”.

Remarks
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.
Module: Fundamentals of construction [M-BGU-101004]

Responsibility: Shervin Haghsheno
Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften
Curricular Anchorage: Compulsory Elective
Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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**Compulsory**

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<tr>
<td>T-BGU-101691</td>
<td>Construction Technology (S. 408)</td>
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<td>Shervin Haghsheno</td>
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<tr>
<td>T-BGU-101675</td>
<td>Project Management (S. 581)</td>
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<td>Shervin Haghsheno</td>
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</table>

**Conditions**
Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**
The student
- is familiar with all substantial domains of construction
- knows and understands substantial construction methods and construction machines
- masters basic construction calculations
- knows and understands the fundamentals of project management in civil engineering

can apply his / her knowledge in a goal-oriented manner to accomplish a construction project efficiently

**Content**
Courses of this module comprise methods and machines from all construction domains. Specifically, the module covers production planning as well as substantial parts of structural engineering and underground engineering, including auxiliary systems. In addition to the explanation of fundamentals, machines, and methods the courses include performance calculations. Further, students receive an introduction to project management in civil engineering which includes project phases, project organization, and the columns of project management which are schedule management, cost management, and quality management.

**Remarks**
We encourage students to deepen their knowledge in construction by building additional customized modules from the courses offered by TMB. Please consult with the tutors of this module. Further information is available at www.tmb.kit.edu.

Responsibility: Christof Weinhardt, Gerhard Satzger

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
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<td>T-WIWI-105775</td>
<td>Foundations of Digital Services B (S. 454)</td>
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<td>Practical Seminar Digital Services (S. 563)</td>
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Learning Control / Examinations

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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:


Qualification Objectives

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 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

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 pushes the 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.

Recommendations
None

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

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

Responsibility: Frank Gauterin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Fahrzeugeigenschaften
Non-Compulsory Block; min. 9 ECTS

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<td>Handling Characteristics of Motor Vehicles I (S. 474)</td>
<td>3</td>
<td>Frank Gauterin</td>
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<tr>
<td>T-MACH-105153</td>
<td>Handling Characteristics of Motor Vehicles II (S. 475)</td>
<td>3</td>
<td>Hans-Joachim Unrau</td>
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<tr>
<td>T-MACH-105154</td>
<td>Vehicle Comfort and Acoustics I (S. 641)</td>
<td>3</td>
<td>Frank Gauterin</td>
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<tr>
<td>T-MACH-105155</td>
<td>Vehicle Comfort and Acoustics II (S. 642)</td>
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<td>Frank Gauterin</td>
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<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I (S. 643)</td>
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<td>Dieter Ammon</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
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<tr>
<td>T-MACH-102177</td>
<td>Global Vehicle Evaluation within Virtual Road Test (S. 473)</td>
<td>3</td>
<td>Bernhard Schick</td>
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<tr>
<td>T-MACH-102206</td>
<td>Vehicle Ride Comfort &amp; Acoustics I (S. 644)</td>
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<td>T-MACH-102205</td>
<td>Vehicle Ride Comfort &amp; Acoustics II (S. 645)</td>
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Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

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

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:
2. Successful completion of module [M-MACH-101260] Materials Science is required before taking this module.

Qualification Objectives
The student
- knows and understands the characteristics of vehicles, owing to the construction and design tokens,
- knows and understands especially the factors being relevant for comfort and acoustics
- is capable of fundamentally evaluating and rating handling characteristics.

Content
See courses.
Recommendations

Workload
See German Version.
Module: Human Resources and Organizations [M-WIWI-101513]

**Responsibility:** Petra Nieken

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

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<tr>
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<td>Human Resource Management (S. 477)</td>
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**Ergänzungsangebot**

Non-Compulsory Block; min. 4,5, max. 5,5 ECTS

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<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102908</td>
<td>Personnel Policies and Labor Market Institutions (S. 553)</td>
<td>4,5</td>
<td>Petra Nieken</td>
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<tr>
<td>T-WIWI-102630</td>
<td>Managing Organizations (S. 520)</td>
<td>3,5</td>
<td>Hagen Lindstädt</td>
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<tr>
<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
<td>2</td>
<td>Hagen Lindstädt</td>
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</tbody>
</table>

**Learning Control / Examinations**

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.

**Conditions**

Successful passing of the corresponding modules of the basic program. The course Personalmanagement (Human Resource Management) is compulsory and must be examined.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

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.

**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.

**Recommendations**
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.
Module: Industrial Production I [M-WIWI-101437]

Responsibility: Frank Schultmann
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

<table>
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<tr>
<td>9</td>
<td>Each term</td>
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Compulsory

Identifier Course ECTS Responsibility
T-WIWI-102606 Fundamentals of Production Management (S. 466) 5,5 Frank Schultmann

Ergänzungsangebot
Non-Compulsory Block; min. 3,5, max. 3,5 ECTS

Identifier Course ECTS Responsibility
T-WIWI-102820 Production Economics and Sustainability (S. 578) 3,5 Magnus Fröhling
T-WIWI-102870 Logistics and Supply Chain Management (S. 510) 3,5 Marcus Wiens

Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.
The course “Fundamentals of Production Management” [2581950] and one additional activity have to be chosen.

Modeled Conditions
The following conditions must be met:

Qualification Objectives
- 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.

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
ADDITIONAL EXAMINATIONS

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: Integrated Production Planning [M-MACH-101272]

Responsibility: Volker Schulze
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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Compulsory

Identifier | Course                                | ECTS | Responsibility |
----------|----------------------------------------|------|----------------|
T-MACH-102106 | Integrated Production Planning (S. 487) | 9    | Gisela Lanza    |

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning they have learned about to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.

Content
Within this engineering sciences-oriented module the students will get to learn principle aspects of organization and planning of production systems. Further information can be found at the description of the lecture “Integrated Production Planning”.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Natural Hazards and Risk Analysis 1 [M-WIWI-101646]

Responsibility: Michael Kunz

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

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Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 12 ECTS

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<td>Geological Hazards and Risks for external students (S. 469)</td>
<td>4</td>
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<td>T-BGU-101693</td>
<td>Hydrology (S. 480)</td>
<td>4</td>
<td>Erwin Zehe</td>
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<tr>
<td>T-BGU-101667</td>
<td>Hydraulic Engineering and Water Management (S. 478)</td>
<td>4</td>
<td>Franz Nestmann</td>
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<tr>
<td>T-BGU-101636</td>
<td>Remote Sensing, exam (S. 592)</td>
<td>4</td>
<td>Stefan Hinz</td>
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<tr>
<td>T-BGU-101637</td>
<td>Systems of Remote Sensing, Prerequisite (S. 638)</td>
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<tr>
<td>T-BGU-101638</td>
<td>Procedures of Remote Sensing, Prerequisite (S. 573)</td>
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<td>Uwe Weidner</td>
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<tr>
<td>T-BGU-101681</td>
<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 497)</td>
<td>3</td>
<td>Sven Wursthorn, Norbert Rösch</td>
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<tr>
<td>T-BGU-103541</td>
<td>Introduction to GIS for Students of Natural, Engineering and Geo Sciences (S. 498)</td>
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<td>Sven Wursthorn, Norbert Rösch</td>
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<td>T-BGU-103542</td>
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<td>T-PHYS-101092</td>
<td>Climatology (S. 399)</td>
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<td>Peter Braesicke</td>
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<td>Exam on Climatology (S. 440)</td>
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<td>Michael Kunz</td>
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<td>T-PHYS-101557</td>
<td>Meteorological Hazards (S. 535)</td>
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<td>T-BGU-101814</td>
<td>Project in Applied Remote Sensing (S. 580)</td>
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<td>Stefan Hinz</td>
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</table>

Learning Control / Examinations
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.

Conditions
There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

Qualification Objectives
See German version

Content
See German version

Recommendations
The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Natural Hazards and Risk Analysis 2 [M-WIWI-101648]

Responsibility: Michael Kunz

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/ Specialisation program

Compulsory Elective Modules/ Elective Module 1/ Engineering Sciences

Compulsory Elective Modules/ Elective Module 2/ Engineering Sciences

Additional Examinations

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<td>Exam on Meteorological Hazards (S. 441)</td>
<td>3</td>
<td>Michael Kunz</td>
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</table>

Learning Control / Examinations

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.

Conditions

There are no singular exams for Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66]. Therefore it not possible to choose Remote Sensing [GEOD-BFB-1] and additionally the courses Remote Sensing Systems, Remote Sensing Methods or the project Angewandte Fernerkundung [20267] (because they are already included). See also “Recommendations”.

Modeled Conditions

The following conditions must be met:

- Module [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1 has to be started before taking this module.

Qualification Objectives

See German version

Content

See German version

Recommendations

The courses Remote Sensing Systems [20241/42] and Remote Sensing Methods [20265/66] may be chosen as a minimal combination
for the exam. However, it is recommended to choose the comprehensive combination Remote Sensing [GEOD-BFB-1], which includes Remote Sensing Systems [20241/42], Remote Sensing Methods [20265/66] and the project Angewandte Fernerkundung [20267].

Remarks
Students, who successfully completed both modules Introduction to Natural Hazards and Risk Analysis 1/2 (alternatively: one of the modules in Bachelor and Master) can get a certificate of the module coordinator (CEDIM). This certificate lists the successful completed courses within the two modules.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Technical Logistics [M-MACH-101269]

Responsibility: Kai Furmans
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<td>T-MACH-102151</td>
<td>Material Flow in Logistic Systems (S. 525)</td>
<td>6</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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<tr>
<td>T-MACH-102092</td>
<td>Industrial Application of Material Handling Systems in Sorting and Distribution Systems (S. 481)</td>
<td>4</td>
<td>Each term</td>
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<td>3</td>
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<tr>
<td>T-MACH-102128</td>
<td>Information Systems and Supply Chain Management (S. 486)</td>
<td>4</td>
<td>Each term</td>
<td>1 semester</td>
<td>3</td>
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<tr>
<td>T-MACH-102163</td>
<td>Basics of Technical Logistics (S. 385)</td>
<td>6</td>
<td>Each term</td>
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<td>3</td>
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<tr>
<td>T-MACH-102159</td>
<td>Elements and Systems of Technical Logistics (S. 432)</td>
<td>4</td>
<td>Each term</td>
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<td>T-MACH-102178</td>
<td>Elements of Technical Logistics and Project (S. 433)</td>
<td>6</td>
<td>Each term</td>
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<td>T-MACH-102160</td>
<td>Selected Applications of Technical Logistics (S. 595)</td>
<td>4</td>
<td>Each term</td>
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<td>3</td>
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<tr>
<td>T-MACH-102161</td>
<td>Selected Applications of Technical Logistics and Project (S. 596)</td>
<td>6</td>
<td>Each term</td>
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<tr>
<td>T-MACH-105149</td>
<td>Industrial Application of Technological Logistics Instancing Crane Systems (S. 482)</td>
<td>4</td>
<td>Each term</td>
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<td>3</td>
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<td>T-MACH-105174</td>
<td>Warehousing and Distribution Systems (S. 646)</td>
<td>4</td>
<td>Each term</td>
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<td>T-MACH-105151</td>
<td>Energy Efficient Intralogistic Systems (S. 435)</td>
<td>4</td>
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<td>T-MACH-105165</td>
<td>Automotive Logistics (S. 382)</td>
<td>4</td>
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<td>T-MACH-105175</td>
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<td>Production and Logistics Controlling (S. 577)</td>
<td>3</td>
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Conditions
Successful passing of the corresponding modules of the basic program.
One of the core courses Material Flow in Logistic Systems [2117051] or Basics of Technical Logistics [2117095] or Elements and systems of Technical Logistics [2117096] is mandatory. Elements and systems of Technical Logistics is only allowed to be examined after Basics of Technical Logistics is passed successfully in this or an other module. For simultaneous attending of both courses, examination dates are sequenced accordingly.

Qualification Objectives
The student acquires
- well-founded knowledge and method knowledge in the main topics of technical logistics,
- expertise and understanding about the functionality of conveyor technology,
- ability for modeling logistic systems with adequate accuracy by using simple models,
- ability to evaluate logistic systems and to identify cause-and-effects-chains within logistic systems.

Content
The module Introduction to Technical Logistics provides first insights into main topics of technical logistics. Within the lectures, the interaction between several components of material handling systems will be clarified. The focus will be on technical characteristics.
of material handling technology and basics for sizing of material handling systems. To gain a deeper understanding, the course is accompanied by exercises and further improved by case studies.
Module: Introduction to Track Guided Transport Systems [M-BGU-102283]

Responsibility: Eberhard Hohnecker

Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<th>Recurrence</th>
<th>Duration</th>
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<tr>
<td>9</td>
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<td>2 Semester</td>
<td>Deutsch</td>
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Compulsory

Identifier | Course | ECTS | Responsibility
--- | --- | --- | ---
T-BGU-104580 | Introduction to Track Guided Transport Systems (S. 503) | 9 | Eberhard Hohnecker

Conditions
Successful passing of the engineering modules of the core programme. For exceptions see § 17 Abs. 6 SPO.
Module: Machine Learning for Finance and Data Science [M-WIWI-102753]

Responsibility: Maxim Ulrich
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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Compulsory

Identifier Course ECTS Responsibility

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<td>T-WIWI-105712</td>
<td>Probabilistic Machine Learning for Finance and Data Science (S. 570)</td>
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<tr>
<td>T-WIWI-105714</td>
<td>Solving Finance Problems using Machine Learning (S. 621)</td>
<td>4,5</td>
<td>Maxim Ulrich</td>
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</table>

Learning Control / Examinations
The assessment is carried out as a module wide exam which itself consists of several partial exams (according to Section 4 (2), 1-3 SPO). A written exam at the end of the semester (120 min) (§4(2), 1 SPO) accounts for 50% of the module-wide grade. Students who have failed the first exam are allowed to retake the exam (during the 4th lecture free week in the same summer term). Another 25% of the module grade is accounted for by the submission of weekly programming problem sets (during the first half of the semester). The presentation and submission of a machine learning programming project (during the 2nd half of the semester) accounts for the final 25% of the module-wide grade. Interested students can in addition earn a “Seminarschein”.

Conditions
A formal prerequisite for taking this module is that students successfully complete all partial exams of the module wide exam within the same semester (only). Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:


Qualification Objectives
We put students into the shoes of a chief risk manager of a global quant asset management firm. Students first learn the most essential finance concepts such as Markowitz approach to portfolio management, the Capital Asset Pricing Model to determine cost of capital (and expected asset returns) of investments, linear factor models to predict expected returns and systematic and unsystematic risk of investments. After completion of this first couple of learning points, students learn modern machine learning tools to accomplish superior predictions for future returns and risks of different asset classes (such as equity, fixed-income, derivatives).

Upon completion of the module, students will have a conceptual, analytical and practical working knowledge of the following concepts and implemented these using Python:

1. Financial Concepts
   A.1 Portfolio Management
      - Markowitz
      - Black-Litterman
   A.2 Predicting an asset’s expected return
      - CAPM, Fama-French, linear factor models
      - Fama-MacBeth
      - ARMA modeling
ADDITIONAL EXAMINATIONS

- State Space modeling
  A.3 Predicting an asset’s future risk
- ARCH/GARCH
- State Space modeling

  1. Machine Learning concepts

B.1 ‘Supervised learning’ within linear and nonlinear models (e.g. least squares, maximum likelihood, Kalman Filter, MCMC)
B.2 ‘Unsupervised learning’ (e.g. PCA, SVD)

Content
This module provides a hands-on introduction to the use of machine learning for modeling financial markets. We will cover methods on how to predict asset returns, how to estimate the risk density of returns and respective risk premiums and how to build optimal portfolios. We will make use of modern statistical machine learning algorithms and test them rigorously with risk and asset management applications. The intuitive, yet analytical combination of machine learning on the one hand and financial applications on the other hand are a key feature of this module. The revealed knowledge will be useful for quantitative industry internships and jobs as well as for quantitative and/or data driven lectures, seminars and bachelor thesis at the FBV or other KIT institutes. In addition to studying the machine learning concepts, students receive numerous opportunities use modern machine learning software in order to solve current financial problems.

Recommendations
This module is self-contained. It is recommended that students have already heard other finance courses, although this is not a formal prerequisite. Students are assumed to have earned at least good grades during the KIT Bachelor’s math, stats, OR and IT courses.

Remarks
The courses of the module are held in English.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Machine Tools and Industrial Handling [M-MACH-101286]

Responsibility: Jürgen Fleischer
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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<th>Recurrence</th>
<th>Duration</th>
<th>Level</th>
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<tr>
<td>9</td>
<td>Each winter term</td>
<td>1 semester</td>
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Compulsory

Identifier | Course                                      | ECTS | Responsibility    |
---         | --------------------------------------------|------|------------------|
T-MACH-102158 | Machine Tools and Industrial Handling (S. 511) | 9    | Jürgen Fleischer |

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students
- are capable to explain the use and application of machine tools and handling devices as well as differentiate their characteristics and structure.
- are able to name and describe the essential components (frame, main spindles, feed axis, peripheral equipment, control) of machine tools.
- Are capable to distinguish and select and describe the essential components regarding structure, characteristics advantages and disadvantages.
- are enabled to dimension the main components of machine tools.
- are able to name and describe the control principles of machine tools.
- are capable to name examples of machine tools and industrial handling as well as to deduce compare the essential components. Additionally they can allocate manufacturing processes.
- are enabled to identify drawbacks as well as derive and asses measures for improvements.
- are qualified to apply methods for selection and evaluation of machine tools.
- are experienced to deduce the particular failure characteristics of a ball screw.

Content
The module overviews the assembly, dimensioning and application of machine tools and industrial handling. A consolidated and practice oriented knowledge is imparted about the choice, dimensioning and assessment of production machines. At first, the major components of machine tools are explained systematically. At this, the characteristics of dimensioning of machine tools are described in detail. Finally, the application of machine tools is demonstrated by means of example machines of the manufacturing processes turning, milling, grinding, massive forming, sheet metal forming and toothing.
Module: Management Accounting [M-WIWI-101498]

Responsibility: Marcus Wouters

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

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Compulsory

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<td>T-WIWI-102800</td>
<td>Management Accounting 1 (S. 513)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
</tr>
<tr>
<td>T-WIWI-102801</td>
<td>Management Accounting 2 (S. 514)</td>
<td>4,5</td>
<td>Marcus Wouters</td>
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Learning Control / Examinations
The assessment is carried out as partial exams (according to Section 4 (2), 13 SPO) of the courses of this module. The assessment procedures are described for each course of the module separately.

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

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:

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

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

Remarks
Students who like this module are probably also interested in the courses
- 2530216 Financial Management
- 2530210 Management Accounting

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Manufacturing Technology [M-MACH-101276]

Responsibility: Volker Schulze
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

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</table>

Compulsory

Identifier Course ECTS Responsibility

T-MACH-102105 Manufacturing Technology (S. 522) 9 Frederik Zanger, Volker Schulze

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students

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

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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Methodical Foundations of OR [M-WIWI-101414]

Responsibility: Oliver Stein

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Operations Research/Specialisation program

Compulsory Elective Modules/Elective Module 2/Operations Research

Additional Examinations

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Wahlpflichtangebot
Non-Compulsory Block; min. 1, max. 3 Courses

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<tr>
<td>T-WIWI-102726</td>
<td>Global Optimization I (S. 470)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-103062</td>
<td>Prerequisite for Nonlinear Optimization I (Bachelor) (S. 566)</td>
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<td>T-WIWI-102724</td>
<td>Nonlinear Optimization I (S. 545)</td>
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Ergänzungsangebot
Non-Compulsory Block; max. 1 Courses

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<tr>
<td>T-WIWI-102727</td>
<td>Global Optimization II (S. 472)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<td>T-WIWI-103638</td>
<td>Global Optimization I and II (S. 471)</td>
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<td>Oliver Stein</td>
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<td>Prerequisite for Nonlinear Optimization II (Bachelor) (S. 567)</td>
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<td>Nonlinear Optimization II (S. 547)</td>
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<td>T-WIWI-103637</td>
<td>Nonlinear Optimization I und II (S. 546)</td>
<td>9</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-103061</td>
<td>Prerequisite for Facility Location and Strategic Supply Chain Management (S. 565)</td>
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<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
<td>4,5</td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102710</td>
<td>Markov Decision Models I (S. 523)</td>
<td>5</td>
<td>Karl-Heinz Waldmann</td>
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Learning Control / Examinations

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.

Conditions

At least one of the lectures Nonlinear Optimization I [2550111] and Global Optimization I [2550134] has to be examined.

Successful passing of the corresponding modules of the basic program.

Modeled Conditions

The following conditions must be met:

- Successful completion of module [M-WIWI-101418] Introduction to Operations Research is required before taking this module.

Qualification Objectives

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.

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.

Remarks
The planned lectures and courses for the next three years are announced online (http://www.ior.kit.edu). For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Microsystem Technology [M-MACH-101287]

**Responsibility:** Volker Saile

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

| Compulsory
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<tr>
<td>T-MACH-105182</td>
<td>Introduction to Microsystem Technology I (S. 499)</td>
<td>3</td>
<td>Jan Gerrit Korvink, Andreas Guber</td>
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**Wahlplfichtangebot**

Non-Compulsory Block; min. 5 ECTS

| Identifier | Course | ECTS | Responsibility |
| T-MACH-105183 | Introduction to Microsystem Technology II (S. 500) | 3 | Andreas Guber |
| T-MACH-102164 | Practical Training in Basics of Microsystem Technology (S. 564) | 3 | Arndt Last |
| T-MACH-100530 | Physics for Engineers (S. 556) | 6 | Alexander Nesterov-Müller, Peter Gumbsch |
| T-MACH-102165 | Selected Topics on Optics and Microoptics for Mechanical Engineers (S. 597) | 3 | Timo Mappes |
| T-MACH-100967 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (S. 387) | 3 | Andreas Guber |
| T-MACH-100968 | BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III (S. 388) | 3 | Andreas Guber |
| T-MACH-101910 | Microactuators (S. 536) | 3 | Manfred Kohl |
| T-MACH-102152 | Novel Actuators and Sensors (S. 548) | 4 | Manfred Kohl, Martin Sommer |
| T-MACH-102080 | Nanotechnology with Clusterbeams (S. 543) | 3 | Jürgen Gspann |
| T-MACH-102172 | Bionics for Engineers and Natural Scientists (S. 389) | 3 | Hendrik Hölscher |
| T-ETIT-101907 | Optoelectronic Components (S. 550) | 4 | Wolfgang Freude |

**Conditions**

Successful passing of the corresponding modules of the basic program.

This module cannot be combined with the module Microsystem Technology in the Master studies.

The course Basics of microsystem technology I [2141861] is compulsory and must be examined.

**Qualification Objectives**

- construction and production of e.g. mechanical, optical, fluidic and sensory microsystems.

**Content**

The module offers courses in microsystem technology. Knowledge is imparted in various fields like basics in construction and production of e.g. mechanical, optical, fluidic and sensory microsystems.

**Remarks**

If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.
Module: Mobile Machines [M-MACH-101267]

**Responsibility:** Marcus Geimer

**Organisation:** KIT-Fakultät für Maschinenbau

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Engineering Sciences/Specialisation program

- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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<td>Once</td>
<td>1 semester</td>
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### Mobile Arbeitsmaschinen

Non-Compulsory Block; min. 9 ECTS

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<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-MACH-102093</td>
<td>Fluid Power Systems (S. 451)</td>
<td>5</td>
<td>Stefan Haug, Martin Scherer, Marcus Geimer</td>
</tr>
<tr>
<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems (S. 615)</td>
<td>3</td>
<td>Marcus Geimer</td>
</tr>
<tr>
<td>T-MACH-102150</td>
<td>BUS-Controls (S. 392)</td>
<td>3</td>
<td>Marcus Geimer, Felix Weber</td>
</tr>
<tr>
<td>T-MACH-105168</td>
<td>Mobile Machines (S. 537)</td>
<td>9</td>
<td>Marcus Geimer</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
<td>1.5</td>
<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1.5</td>
<td>Jörg Zürn</td>
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### Learning Control / Examinations

The assessment is carried out as a general oral exam (according to Section 4(2), 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The examination is offered every semester. Re-examinations are offered at every ordinary examination date.

The overall grade of the module is the grade of the oral examination.

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

### Conditions

Successful passing of the corresponding modules of the basic program.

### Modeled Conditions

The following conditions must be met:

2. Successful completion of module [M-MACH-101260] *Materials Science* is required before taking this module.

### Qualification Objectives

The student

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

### Content

In the module of *Mobile Machines* [WI4INGMB15] the students will learn the structure of the machines and deepen the knowledge of the subject for developing the machines. After conclusion the module the student will know the latest developments in mobile...
machines and is able to evaluate the concepts and the trends of developments. The module is practically orientated and supported by industry partners.

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

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Mobility and Infrastructure [M-BGU-101067]

Responsibility: Ralf Roos

Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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Compulsory

Identifier: T-BGU-101791
Course: Mobility and Infrastructure (S. 538)
ECTS: 9
Responsibility: Ralf Roos

Conditions
Successful passing of the corresponding modules of the basic program.

Qualification Objectives
Learning the fundamental terminology and methodology of spatial and transportation planning, traffic engineering as well as highway engineering.

Content
Basic tasks and contents of different planning levels, for example: Land use and conflicts, provision of services and infrastructure as well as their costs, planning on local, regional, national and European level.

Fundamentals of transportation planning (convention for analyses, surveys of travel behaviour), fundamentals of traffic engineering.

Design Basics in Highway Engineering: Road network layout, driving dynamics, principles of highway design; earthworks, pavements and their dimensioning.
# Module: Power Network [M-ETIT-102379]

**Responsibility:** Thomas Leibfried, Bernd Hoferer

**Organisation:** KIT-Fakultät für Elektrotechnik und Informationstechnik

**Curricular Anchorage:** Compulsory Elective

**Contained in:**
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

## ECTS

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<tr>
<td>T-ETIT-101923</td>
<td>Electric Energy Systems (S. 429)</td>
<td>5</td>
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<td>Thomas Leibfried</td>
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<tr>
<td>T-ETIT-100830</td>
<td>Power Network (S. 562)</td>
<td>6</td>
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<td>Thomas Leibfried</td>
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**Conditions**

Successful passing of the corresponding modules of the basic program.
Module: Product Lifecycle Management [M-MACH-101270]

Responsibility: Jivka Ovtcharova

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in: Engineering Sciences/Specialisation program

Compulsory Elective Modules/Elective Module 1/Engineering Sciences

Compulsory Elective Modules/Elective Module 2/Engineering Sciences

Additional Examinations

ECTS Recurrence Duration Level
9 Each term 1 semester 3

Compulsory

Identifier Course ECTS Responsibility
T-MACH-105147 Product Lifecycle Management (S. 575) 6 Jivka Ovtcharova

Product Lifecycle Management
Non-Compulsory Block; min. 3 ECTS

Identifier Course ECTS Responsibility
T-MACH-102125 Computer Integrated Planning of New Products (S. 405) 4 Roland Kläger
T-MACH-102153 PLM-CAD Workshop (S. 558) 4 Jivka Ovtcharova
T-MACH-102181 PLM for Product Development in Mechatronics (S. 557) 4 Martin Eigner
T-MACH-102209 Information Engineering (S. 484) 3 Jivka Ovtcharova
T-MACH-105937 Information management in production (S. 485) 4 Oliver Riedel

Conditions
The course Product Lifecycle Management [2121350] is compulsory and has to be passed. Successful passing of the corresponding modules of the basic program.

Qualification Objectives
The students should:

- have basic knowledge about the challenges in product and process data management regarding the whole product lifecycle;
- have understanding about challenges and functional concepts of product lifecycle management;
- be able to operate common PLM systems.

Content
This module describes management and organizational approaches of Product Lifecycle Management, their application in IT and the potential benefits of PLM system solutions. Optional courses of this module introduce current product development processes in the scope of enterprise PLM system solutions.
**Module: Public Finance [M-WIWI-101403]**

**Responsibility:** Berthold Wigger  
**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften  
**Curricular Anchorage:** Compulsory Elective  
**Contained in:** Economics/Specialisation program  
Compulsory Elective Modules/Elective Module 2/Economics  
Additional Examinations

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<td>Each term</td>
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**Wahlpflichtangebot**  
Non-Compulsory Block; min. 9, max. 9 ECTS

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<td>T-WIWI-102739</td>
<td>Public Revenues (S. 586)</td>
<td>4,5</td>
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<tr>
<td>T-WIWI-102790</td>
<td>Specific Aspects in Taxation (S. 629)</td>
<td>4,5</td>
<td>Armin Bader, Berthold Wigger</td>
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<tr>
<td>T-WIWI-102836</td>
<td>Monetary and Financial Policy (S. 541)</td>
<td>4,5</td>
<td>Joachim Nagel, Berthold Wigger</td>
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<tr>
<td>T-WIWI-102877</td>
<td>Monetary and Financial Policy (S. 542)</td>
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<td>Berthold Wigger</td>
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**Learning Control / Examinations**

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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:

- Successful completion of module [M-WIWI-101398] *Introduction to Economics* is required before taking this module.

**Qualification Objectives**

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.

**Recommendations**

It is recommended to attend the course *Spezielle Steuerlehre* [2560129] after having completed the course *Öffentliche Einnahmen* [2560120].

**Remarks**

See German version.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Rail System Technology [M-MACH-101274]

Responsibility: Peter Gratzfeld

Organisation: KIT-Fakultät für Maschinenbau

Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

**Compulsory**

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<th>Level</th>
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<tr>
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<td>1 semester</td>
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**Identifier**

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<td>Rail System Technology (S. 588)</td>
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**Learning Control / Examinations**

The assessment is carried out as a general oral exam (45 min.) (according to Section 4(2), 2 of the examination regulation) of the single courses of this module. The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The overall grade of the module is the grade of the oral examination.

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Qualification Objectives**

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- They deduce the fundamental requirements for rail vehicles out of it and assess concepts of rail vehicles.
- They know about major systems in a rail vehicle and evaluate their fitness in specific fields of application.
- The students realize that the typical business model in railway industry is a project. They learn main features and characteristics of project management in this area.

**Content**

- Overview about fundamental components of a modern rail system (vehicles, infrastructure, operation)
- History and economic impact of rail systems
- Vehicle dynamics, wheel-rail-contact, train protection, traction power supply
- Main systems of rail vehicles (electric and non-electric traction drive, bogies, brakes)
- Vehicle concepts for mass transit and main line
- Main features and characteristics of project management in railway industry (project management system, organization, main processes)

**Recommendations**

The lectures can be taken simultaneously.

**Workload**

1. Regular attendance: 63 hours
2. Self-study: 63 hours
3. Exam and preparation: 144 hours
Module: Real Estate Management [M-WIWI-101466]

Responsibility: Thomas Lützkendorf

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in:
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

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<td>Real Estate Management I (S. 590)</td>
<td>4.5</td>
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<td>T-WIWI-102745</td>
<td>Real Estate Management II (S. 591)</td>
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**Learning Control / Examinations**

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.

**Conditions**

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

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.

**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.

**Recommendations**

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)
ADDITIONAL EXAMINATIONS

is recommended.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Risk and Insurance Management [M-WIWI-101436]

Responsibility: Ute Werner
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<tr>
<td>T-WIWI-102603</td>
<td>Principles of Insurance Management (S. 569)</td>
<td>4,5</td>
<td>Ute Werner</td>
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<tr>
<td>T-WIWI-102608</td>
<td>Enterprise Risk Management (S. 439)</td>
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Learning Control / Examinations
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 lectures are examined by oral presentations and related term papers in the context of the lectures. Furthermore, there is a final oral examination.

The grade of each examination consists of the oral presentation and the term paper (50 percent) and the oral examination (50 percent). 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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:


Qualification Objectives
See German version.

Content
See German version.
Module: Specialization in Customer Relationship Management [M-WIWI-101422]

Responsibility: Andreas Geyer-Schulz
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

Non-Compulsory Block; min. 1, max. 2 Courses

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<tr>
<td>T-WIWI-102596</td>
<td>Analytical CRM (S. 373)</td>
<td>4,5</td>
<td>Andreas Geyer-Schulz</td>
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<tr>
<td>T-WIWI-102597</td>
<td>Operative CRM (S. 549)</td>
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Non-Compulsory Block; max. 1 Courses

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<td>T-WIWI-100005</td>
<td>Competition in Networks (S. 402)</td>
<td>4,5</td>
<td>Kay Mitusch</td>
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<tr>
<td>T-WIWI-105771</td>
<td>Foundations of Digital Services A (S. 452)</td>
<td>4,5</td>
<td>Christof Weinhardt, Gerhard Satzger</td>
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Learning Control / Examinations
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, 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.

Conditions
Successful passing of the corresponding modules of the basic program.

- 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.
- At least, one of the courses Analytic CRM [2540522] and Operative CRM [2540520] has to be taken.

Modeled Conditions
The following conditions must be met:
1. Module [M-WIWI-101460] CRM and Service Management has to be started before taking this module.
2. Successful completion of module [M-WIWI-101494] Fundamentals of Business Administration 1 is required before taking this module.

Qualification Objectives
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.

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 (Extraction / Translation / Loading). The process of modelling a data-warehouse as well as the so-called extraction, translation, 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, . . . )

Remarks
The courses Analytical CRM and Operative CRM will take place in an alternating way from winter term 14/15. Analytical CRM is offered for a last time in the summer term 14. Details on

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Specialization in Production Engineering [M-MACH-101284]

Responsibility: Volker Schulze
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective
Contained in: Engineering Sciences/Specialisation program
Compulsory Elective Modules/Elective Module 1/Engineering Sciences
Compulsory Elective Modules/Elective Module 2/Engineering Sciences
Additional Examinations

Additional Examinations

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Vertiefung der Produktionstechnik
Non-Compulsory Block; min. 9 ECTS

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<td>T-MACH-102107</td>
<td>Quality Management (S. 587)</td>
<td>4</td>
<td>Gisela Lanza</td>
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<tr>
<td>T-MACH-105166</td>
<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry (S. 527)</td>
<td>4</td>
<td>Stefan Kienzle, Dieter Steegmüller</td>
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<tr>
<td>T-MACH-105177</td>
<td>Metal Forming (S. 534)</td>
<td>4</td>
<td>Florian Herlan</td>
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<tr>
<td>T-MACH-105185</td>
<td>Control Technology (S. 409)</td>
<td>4</td>
<td>Christoph Gönnheimer</td>
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<tr>
<td>T-MACH-102148</td>
<td>Gear Cutting Technology (S. 468)</td>
<td>4</td>
<td>Markus Klaiber</td>
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<tr>
<td>T-MACH-102189</td>
<td>Production Technology and Management in Automotive Industry (S. 579)</td>
<td>4</td>
<td>Volker Michael Stauch</td>
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<tr>
<td>T-MACH-105188</td>
<td>Integrative Strategies in Production and Development of High Performance Cars (S. 488)</td>
<td>4</td>
<td>Karl-Hubert Schlichtenmayer</td>
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Qualification Objectives

Der/die Studierende

- besitzt grundlegende Kenntnisse über die industrielle Anwendung der Informationstechnologie im Gebiet der Produktentstehung,
- versteht die gegenwärtige und zukünftige Nutzung von Informationssystemen im Produktentstehungsprozess im Kontext des Product Lifecycle Managements und des Virtual Engineering,
- ist in der Lage, gängige Cax- und PLM-Systeme im Produktentstehungsprozess einzusetzen.

Content


Remarks

Module: Stochastic Methods and Simulation [M-WIWI-101840]

Responsibility:
Organization: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Additional Examinations

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### Compulsory

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<tr>
<td>T-WIWI-102627</td>
<td>Simulation I (S. 613)</td>
<td>4,5</td>
<td>Karl-Heinz Waldmann</td>
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### Ergänzungsangebot
Non-Compulsory Block; min. 4,5 ECTS

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<tr>
<td>T-WIWI-102711</td>
<td>Markov Decision Models II (S. 524)</td>
<td>4,5</td>
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<td>T-WIWI-102703</td>
<td>Simulation II (S. 614)</td>
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<td>Prerequisite for Nonlinear Optimization I (Bachelor) (S. 566)</td>
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<td>Nonlinear Optimization I (S. 545)</td>
<td>4,5</td>
<td>Oliver Stein</td>
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<tr>
<td>T-WIWI-105940</td>
<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<tr>
<td>T-WIWI-102714</td>
<td>Tactical and Operational Supply Chain Management (S. 639)</td>
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<td>Stefan Nickel</td>
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### Learning Control / Examinations
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.

### Conditions
None

### Modeled Conditions
The following conditions must be met:
- Successful completion of module [M-WIWI-101418] Introduction to Operations Research is required before taking this module.

### Qualification Objectives
The student possesses profound knowledge in modelling, analyzing and optimizing stochastic systems in economy and engineering.

### Content
Markov Decision Models I: Markov Chains, Poisson Processes
Markov Decision Models II: Queuing Systems, Stochastic Decision Processes
Simulation I: Generation of random numbers, Monte Carlo integration, Discrete event simulation, Discrete and continuous random variables, Statistical analysis of simulated data.
Simulation II: Variance reduction techniques, Simulation of stochastic processes, Case studies.

### Remarks
The planned lectures and courses for the next two years are announced online (http://www.ior.kit.edu/).
Module: Strategy and Organization [M-WIWI-101425]

Responsibility: Hagen Lindstädt
Organisation: KIT-Fakultät für Wirtschaftswissenschaften
Curricular Anchorage: Compulsory Elective
Contained in: Business Administration/Specialisation program
Compulsory Elective Modules/Elective Module 1/Business Administration
Compulsory Elective Modules/Elective Module 2/Business Administration
Additional Examinations

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<td>T-WIWI-102871</td>
<td>Problem Solving, Communication and Leadership (S. 571)</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

Modeled Conditions
The following conditions must be met:


Qualification Objectives
See German version.

Content

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
**Module: Supply Chain Management [M-WIWI-101421]**

**Responsibility:** Stefan Nickel

**Organisation:** KIT-Fakultät für Wirtschaftswissenschaften

**Curricular Anchorage:** Compulsory Elective

**Contained in:** Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

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<td>Each term</td>
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**Wahlpflichtangebot**
Non-Compulsory Block; min. 1, max. 2 Courses

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<td>T-WIWI-102598</td>
<td>Management of Business Networks (S. 516)</td>
<td>4.5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102760</td>
<td>Management of Business Networks (Introduction) (S. 517)</td>
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<td>Christof Weinhardt</td>
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**Ergänzungsangebot**
Non-Compulsory Block; max. 4 Courses

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<tr>
<td>T-WIWI-103061</td>
<td>Prerequisite for Facility Location and Strategic Supply Chain Management (S. 565)</td>
<td></td>
<td>Stefan Nickel</td>
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<tr>
<td>T-WIWI-102704</td>
<td>Facility Location and Strategic Supply Chain Management (S. 443)</td>
<td>4.5</td>
<td>Stefan Nickel</td>
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<td>Prerequisite for Tactical and Operational Supply Chain Management (S. 568)</td>
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<td>T-WIWI-102714</td>
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<tr>
<td>T-MACH-102089</td>
<td>Logistics - Organisation, Design and Control of Logistic Systems (S. 508)</td>
<td>6</td>
<td>Kai Furmans</td>
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**Learning Control / Examinations**

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.

**Conditions**

At least one of the courses Management of Business Networks [2590452] and Management of Business Networks (Introduction) [2540496] has to be taken.

Successful passing of the corresponding modules of the basic program.

**Modeled Conditions**

The following conditions must be met:


**Qualification Objectives**

The students
ADDITIONAL EXAMINATIONS

- 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

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 “Management of Business Networks” the focus is set on the strategic aspects of management and information systems. The course is held in English and teaches parts of the syllabus with the support of a case study elaborated with Prof Kersten from Concordia University, Montreal, Canada. The course MBN introduction is consisting out of the first part of the regular MBN lecture, but as it has less credits will not include the analysis of the case study.

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

Remarks
The planned lectures in the next terms can be found on the websites of the respective institutes IISM, IFL and IOR.
Module: Topics in Finance I [M-WIWI-101465]

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: 
- Compulsory Elective
- Business Administration/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Business Administration
- Compulsory Elective Modules/Elective Module 2/Business Administration
- Additional Examinations

ECTS Recurrence Duration Level
9 Each term 1 semester 3

Wahlpflichtangebot
Non-Compulsory Block; min. 9, max. 9 ECTS

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
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<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102623</td>
<td>Financial Intermediation (S. 449)</td>
<td>4,5</td>
<td>Martin Ruckes</td>
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<tr>
<td>T-WIWI-102643</td>
<td>Derivatives (S. 416)</td>
<td>4,5</td>
<td>Marliese Uhrig-Homburg</td>
</tr>
<tr>
<td>T-WIWI-102625</td>
<td>Exchanges (S. 442)</td>
<td>1,5</td>
<td>Jörg Franke</td>
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<tr>
<td>T-WIWI-102626</td>
<td>Business Strategies of Banks (S. 397)</td>
<td>3</td>
<td>Wolfgang Müller</td>
</tr>
<tr>
<td>T-WIWI-102646</td>
<td>International Finance (S. 489)</td>
<td>3</td>
<td>Marliese Uhrig-Homburg</td>
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<tr>
<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
<td>4,5</td>
<td>Christof Weinhardt</td>
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<tr>
<td>T-WIWI-102790</td>
<td>Specific Aspects in Taxation (S. 629)</td>
<td>4,5</td>
<td>Armin Bader, Berthold Wigger</td>
</tr>
<tr>
<td>T-WIWI-102879</td>
<td>Asset Management (S. 376)</td>
<td>3</td>
<td>Andreas Sauer</td>
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Learning Control / Examinations
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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.

Conditions
Successful passing of the corresponding modules of the basic program.

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.

Modeled Conditions
The following conditions must be met:

3. Module [M-WIWI-101435] Essentials of Finance has to be started before taking this module.

Qualification Objectives
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

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.
Recommendations
None
Module: Topics in Finance II [M-WIWI-101423]

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Organisation: KIT-Fakultät für Wirtschaftswissenschaften

Curricular Anchorage: Compulsory Elective

Contained in: Business Administration/Specialisation program

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<td>International Finance (S. 489)</td>
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<td>Marliese Uhrig-Homburg</td>
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<td>T-WIWI-102600</td>
<td>eFinance: Information Engineering and Management for Securities Trading (S. 427)</td>
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<td>Christof Weinhardt</td>
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<td>Specific Aspects in Taxation (S. 629)</td>
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Learning Control / Examinations

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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.

Conditions

Successful passing of the corresponding modules of the basic program.

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.

Modeled Conditions

The following conditions must be met:

3. Module [M-WIWI-101435] Essentials of Finance has to be started before taking this module.

Qualification Objectives

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

Remarks

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.
ADDITIONAL EXAMINATIONS

Workload
The total workload for this module is approximately 270 hours.
Module: Vehicle Development [M-MACH-101265]

Responsibility: Frank Gauterin
Organisation: KIT-Fakultät für Maschinenbau
Curricular Anchorage: Compulsory Elective

Contained in:
- Engineering Sciences/Specialisation program
- Compulsory Elective Modules/Elective Module 1/Engineering Sciences
- Compulsory Elective Modules/Elective Module 2/Engineering Sciences
- Additional Examinations

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Fahrzeugentwicklung
Non-Compulsory Block; min. 9 ECTS

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<tr>
<td>T-MACH-105156</td>
<td>Vehicle Mechatronics I (S. 643)</td>
<td>3</td>
<td>Dieter Ammon</td>
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<tr>
<td>T-MACH-105160</td>
<td>Fundamentals in the Development of Commercial Vehicles I (S. 461)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-105161</td>
<td>Fundamentals in the Development of Commercial Vehicles II (S. 462)</td>
<td>1,5</td>
<td>Jörg Zürn</td>
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<tr>
<td>T-MACH-102207</td>
<td>Tires and Wheel Development for Passenger Cars (S. 640)</td>
<td>3</td>
<td>Günter Leister</td>
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<tr>
<td>T-MACH-105162</td>
<td>Fundamentals of Automobile Development I (S. 463)</td>
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<td>Rolf Frech</td>
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<td>T-MACH-105163</td>
<td>Fundamentals of Automobile Development II (S. 464)</td>
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<td>Rolf Frech</td>
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<tr>
<td>T-MACH-102156</td>
<td>Project Workshop: Automotive Engineering (S. 582)</td>
<td>4,5</td>
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<td></td>
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<td>Michael Frey</td>
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<tr>
<td>T-MACH-105172</td>
<td>Simulation of Coupled Systems (S. 615)</td>
<td>3</td>
<td>Marcus Geimer</td>
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Learning Control / Examinations
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.

Conditions
Successful passing of the corresponding modules of the basic program.

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

Content
See courses.

Recommendations

Workload
See German version.
Part VII

Differing module descriptions SPO 2007

Module: Business Administration [WI1BWL1]

Responsibility: M. Uhrig-Homburg, M. Ruckes

<table>
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<tr>
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<tr>
<td>T-WIWI-102819</td>
<td>Business Administration: Finance and Accounting (S. 393)</td>
<td>4.0</td>
<td>Marliese Uhrig-Homburg, Martin Ruckes</td>
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<tr>
<td>T-WIWI-102817</td>
<td>Business Administration: Strategic Management and Information Engineering and Management (S. 395)</td>
<td>3.0</td>
<td>Martin Ruckes, Petra Nieken</td>
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<tr>
<td>T-WIWI-102818</td>
<td>Business Administration: Production Economics and Marketing (S. 394)</td>
<td>4.0</td>
<td>Frank Schultmann, Martin Klar mann, Martin Ruckes, Thomas Lützkendorf, Wolf Fichtner</td>
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<tr>
<td>T-WIWI-102816</td>
<td>Financial Accounting and Cost Accounting (S. 447)</td>
<td>4.0</td>
<td>Jan-Oliver Strych</td>
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Learning Control / Examinations

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. The examinations take place at the beginning of the recess period. Re-examinations are offered at every ordinary examination date. The assessment procedures of each course of this module is defined for each course 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.

Conditions

None.

Recommendations

It is strongly recommended to attend the courses in the following sequence:
1st term: Business Administration: Strategic Management and Information Engineering and Management [2600023] and Business Administration: Finance and Accounting [25026/25027]
2nd term: Business Administration: Production Economics and Marketing [25024/25025]

Qualification Objectives

The student

- has core skills in business administration in particular with respect to decision making and model based view of corporations
- masters the fundamentals of managerial and financial accounting as well as business administration
- is able to analyse and assess the central tasks, functions and decisions in modern corporations

This module sets the base for advanced courses in the field of business administration and management science.

Content

This module provides the fundamentals of managerial and financial accounting as well as business administration and management science. Then, the module focuses on the fields of marketing, production economics, information engineering and management, management and organization, investment and finance and the german specific term controlling.

Workload

The total workload for this module is approximately 450 hours. For further information see German version.

Remarks

The title and partly the content of each lecture within this module has changed in the winter semester 2012/13.
Module: Economics [M-WIWI-101398]

Responsibility: Clemens Puppe

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Compulsory

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<tbody>
<tr>
<td>T-WIWI-102708</td>
<td>Economics I: Microeconomics (S. 422)</td>
<td>5,0</td>
<td>Clemens Puppe, Johannes Philipp Reiß</td>
</tr>
<tr>
<td>T-WIWI-102709</td>
<td>Economics II: Macroeconomics (S. 424)</td>
<td>5,0</td>
<td>Berthold Wigger</td>
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</table>

Learning Control / Examinations
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. The assessment procedures of each course of this module is defined for each course separately.

Module Grade
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.

Qualification Objectives
The student
- knows and understands basic economic problems,
- understands economic policy in globalized markets,
- is able to develop elementary solution concepts.

The lectures of this module have different focuses: In Economics I, economic problems are seen as decision problems, Economics II treats the dynamics of economic processes.

Content
The basic concepts, methods and models of micro- and macroeconomics are treated. The course Economics I: Microeconomics [2600012] deals with micro-economic decision theory, questions of market theory and problems of imperfect competition and with basic principles of game theory and welfare economics. Economics II: Macroeconomics [2600014] discusses economic organization models and national accounts as well as the question of international trade and monetary policy. Furthermore, the complex growth, boom and economic speculations are dealt with.

Workload
See German version.
Module: Introduction to Informatics [WI1INFO]

Responsibility: H. Schmeck, R. Studer, Y. Sure-Vetter, M. Zöllner

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<tr>
<td>T-WIWI-102735</td>
<td>Introduction to Programming with Java (S. 502)</td>
<td>5,0</td>
<td>M. Zöllner</td>
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<tr>
<td>T-WIWI-102749</td>
<td>Foundations of Informatics I (S. 455)</td>
<td>5,0</td>
<td>York Sure-Vetter</td>
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<tr>
<td>T-WIWI-102707</td>
<td>Foundations of Informatics II (S. 456)</td>
<td>5,0</td>
<td>Hartmut Schmeck</td>
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Learning Control / Examinations

The assessment is carried out as partial exams (according to Section 4(2), 1 and 3 of the examination regulation) of the individual courses of this module.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. For a successful module assessment all partial exams have to be passed:

- **Introduction to Programming with Java**
  - Compulsory tests in the computer lab
  - Written exam resp. computer-based exam (60 min)
  - The successful completion of the compulsory tests in the computer lab is prerequisite for admission to the written resp. computer-based exam.

- **Foundations of Informatics I**
  - Written exam in the first week of the recess period (60 min)

- **Foundations of Informatics II**
  - Written exam in the first week of the recess period (90 min)
  - It is possible to gain 0.3-0.4 grading points to the written exam by successful participation in the exercises (achieving a minimum number of points for solutions to the exercises), or by successful completion of a bonus exam (both according to Section 4 (2), 3 of the examination regulation).

When all partial exams are passed, the overall grade of the module is the average of the grades for each course weighted by the credit points and truncated after the first decimal.

Conditions

None.

Recommendations

It is strongly recommended to attend the courses in the following sequence: *Introduction to Programming with Java* [2511000], *Foundations of Informatics I* [2511010] *Foundations of Informatics II* [2511012]

Qualification Objectives

The student

- knows the main principles, methods and systems of computer science,
- can use this knowledge for applications in advanced computer science courses and other areas for situation-adequate problem solving,
- is capable of finding strategic and creative responses in the search for solutions to well defined, concrete, and abstract problems.

The student can deepen the learned concepts, methods, and systems of computer science in advanced computer science lectures.

Content

This module conveys knowledge of the widespread object-oriented programming Java language. Furthermore, the topics modeling, logic, algorithms, sorting and searching algorithms, complexity theory, problem specifications, and dynamic data structures are addressed. From the field of theoretical computer science, formal models of automata, languages and algorithms are presented and applied to the architecture of computer systems.

Workload

The total workload for this module is approximately 450 hours. For further information see German version.
Module: Mass and Energy Balances for Reacting Systems [WI1ING1]

Responsibility: P. Pfeifer, B. Kraushaar-Czarnetzki

<table>
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<tr>
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<td>2.5</td>
<td>Every 2nd term, Winter Term</td>
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<td>T-CIWVT-101873</td>
<td>Mass and Energy Balances for Reacting Systems (S. ??)</td>
<td>2.5</td>
<td>Peter Pfeifer</td>
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</table>

Learning Control / Examinations

The assessment is carried out by a written exam about the lecture Mass and Energy Balances for Reacting Systems [22130] (according §4(2), 1 of the examination regulation). The overall grade of this module is the grade of the written exam.

Conditions
None.

Qualification Objectives

The student

- knows and understands integral mass and energy balances of simple systems in process engineering,
- can apply integral mass and balances on selected systems and processes.

Content

- Aim and approach
- Mass balance
- Water
- Nitrogen and ammonia
- Energy balance
- Natural gas
- Carbon dioxide

Workload

The total workload for this module is approximately 75.0 hours. For further information see German version.
Module: Materials Science [WI1ING2]

Responsibility: M. Hoffmann

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<td>T-MACH-102078</td>
<td>Materials Science I (S. 528)</td>
<td>2.5</td>
<td>Michael Hoffmann</td>
</tr>
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</table>

Learning Control / Examinations
The assessment of the module is carried out by a written examination (150 min) about the lecture Material Science I (2125760) (according to Section 4(2), 1 of the examination regulation).
The examination is offered every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.
The grade of the module corresponds to the grade of this examination.

Conditions
None.

Qualification Objectives
Students are able to specify the basics of materials science and engineering and can apply it to simple problems in various technical areas.
As major part of the module, the students know the correlation between atomic structure and bonding of solids and the macroscopic properties such as mechanical behavior or electrical conductivity. They have basic knowledge with respect to materials characterization. The students are able to analyze phase diagrams with up to two components and can derive simple correlations among composition, processing, microstructure evolution and materials properties.

Content
After an introduction to the atomic structure and interatomic bonding, elementary concepts of crystallography are given. Different types of crystal structures are explained and various types of imperfections in solids. Then, the mechanical behaviour and the physical properties of various types of materials (metals, polymers, ceramics) are discussed. The thermodynamic principles of solidification and the basic types of phase diagrams are given to understand to iron-carbon phase diagram and the manifold microstructures of steel and cast iron.

Workload
The total workload for this module is approximately 75.0 hours. For further information see German version.
Module: Engineering Mechanics [WI1ING3]

Responsibility: A. Fidlin

ECTS
2.5

Recurrence
Every 2nd term, Winter Term

Duration
1 term

Compulsory

Identifier Course ECTS Responsibility
T-MACH-102208 Introduction to Engineering Mechanics I : Statics and Strength of Materials (S. 494) 2.5 Alexander Fidlin

Learning Control / Examinations

The assessment of the module is carried out by a written examination about the lecture Engineering Mechanics [2161208] (according to Section 4(2), 1 of the examination regulation).

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

Conditions
None.

Qualification Objectives
The student

- knows and understands the basic elements of statics,
- is able to solve basic problems in statics independently.

Content
Statics: force • moment • general equilibrium conditions • center of gravity • inner forces in structure • plane frameworks • adhesion

Workload
The total workload for this module is approximately 75.0 hours. For further information see German version.

Remarks
Starting summer 2016 the course "Introduction to Engineering Mechanics I : Statics and Strength of Materials" [2161238] will be held in summer term.
Module: Electrical Engineering [W11ING4]

Responsibility: W. Menesklou

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<td>Electrical Engineering I (S. 430)</td>
<td>2.5</td>
<td>Wolfgang Menesklou</td>
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Learning Control / Examinations
The assessment of the module is carried out by a written examination about the lecture Electrical Engineering I [23223] (according to Section 4(2), 1 of the examination regulation).
The grade of the module corresponds to the grade of this examination.

Conditions
None.

Qualification Objectives
The student knows and understands basic terms of electrical engineering and should be able to carry out simple calculations of DC and AC circuits.

Content
Supporting the lecture, assignments to the curriculum are distributed. These are solved into additional (voluntary) tutorials.

Workload
The total workload for this module is approximately 75.0 hours. For further information see German version.
Module: Mathematics [WI1MATH]

Responsibility: G. Last

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<tr>
<td>T-MATH-102261</td>
<td>Mathematics I - Final Exam (S. 529)</td>
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<td>T-MATH-102262</td>
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<td>T-MATH-102263</td>
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<td>T-MATH-102264</td>
<td>Mathematics III - Final Exam (S. 533)</td>
<td>7,0</td>
<td>Daniel Hug, Günter Last, Martin Folkers, Steffen Winter</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
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 overall grade of the module is the average of the grades for each course truncated after the first decimal.
The assessment procedures of each course of this module is defined for each course separately.

Conditions
The admission to the examinations carried out regardless of the evidence of the other examinations in the module.

Recommendations
It is strongly recommended to attend the courses in the following sequence: Mathematics I [01350], Mathematics II [01830] Mathematics III [01352]

Qualification Objectives
See German version.

Content

Workload
The total workload for this module is approximately 630 hours. For further information see German version.
Module: Statistics [M-WIWI-101432]

Responsibility: Melanie Schienle

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Identifier</th>
<th>Course</th>
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<tr>
<td>10</td>
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<td>T-WIWI-102737</td>
<td>Statistics I (S. 631)</td>
<td>5.0</td>
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<td>T-WIWI-102738</td>
<td>Statistics II (S. 632)</td>
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<td>Melanie Schienle</td>
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</tbody>
</table>

Learning Control / Examinations
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.

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

Conditions
Notice: The lecture Statistics I [25008/25009] is part of the preliminary examination concerning Section 8(1) of the examination regulation. This examination must be passed until the end of the examination period of the second semester. Any Re-examinations has to be passed until the end of the examination period of the third semester. Otherwise the examination claim will be lost.

Qualification Objectives
See German version.

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, convolution and limit distributions
C. Theory of estimation and testing: sufficiency of statistics, point estimation (optimality, ML-method ), internal estimations, theory of tests (optimality, most important examples of tests)

Workload
The total workload for this module is approximately 300 hours. For further information see German version.
<table>
<thead>
<tr>
<th>Identifier</th>
<th>Course</th>
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<th>Responsibility</th>
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<tr>
<td>T-WIWI-103485</td>
<td>Seminar in Informatics (Bachelor) (S. 604)</td>
<td>3.0</td>
<td>Andreas Oberweis, Hartmut Schmeck, Johann Marius Zöllner, Rudi Studer, York Sure-Vetter</td>
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<td>Andreas Geyer-Schulz, Bruno Neibecker, Christof Weinhardt, David Lorenz, Frank Schultmann, Gerhard Satzger, Hagen Lindstädt, Hansjörg Fromm, Ju-Young Hinz, Marcus Wouters, Marion Weissenberger-Eibl, Marliese Uhrig-Homburg, Martin Klarmann, Martin Ruckes, Orestis Terzidis, Petra Nieken, Stefan Nickel, Thomas Lützkendorf, Ute Werner, Wolf Fichtner</td>
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<td>T-WIWI-103486</td>
<td>Seminar in Business Administration (Bachelor) (S. 600)</td>
<td>3.0</td>
<td>Berthold Wigger, Clemens Puppe, Ingrid Ott, Jan Kowalski, Johannes Philipp Reiß, Kay Mitusch, Marten Hillebrand</td>
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<td>Karl-Heinz Waldmann, Oliver Stein, Stefan Nickel, Melanie Schienle, Oliver Grothe, Wolf-Dieter Heller</td>
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<td>T-WIWI-103487</td>
<td>Seminar in Economics (Bachelor) (S. 602)</td>
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<td>T-WIWI-103488</td>
<td>Seminar in Operations Research (Bachelor) (S. 608)</td>
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<td>Günter Last, Martin Folkers</td>
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<td>T-WIWI-103489</td>
<td>Seminar in Statistics (Bachelor) (S. 609)</td>
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<td>Thomas Dreier</td>
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<td>T-WIWI-102755</td>
<td>Seminar in Engineering Science (Bachelor) (S. 603)</td>
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<td>ZAK, HoC</td>
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<td>T-INFO-101997</td>
<td>Seminar: Legal Studies I (S. 610)</td>
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<td>SemSQ (Bachelor)</td>
<td>Seminar Key Skills (Bachelor)</td>
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</table>
**Learning Control / Examinations**
The modul examination consists of two seminars and of at least one key qualification (KQ) course (according to §4 (3), 3 of the examination regulation). A detailed description of every singled assessment is given in the specific course characterization. The final mark for the module is the average of the marks for each of the two seminars weighted by the credits and truncated after the first decimal. Grades of the KQ courses are not included.

**Conditions**
All modules of the core programme should have been absolved. Furthermore the course specific preconditions must be observed.

- **Seminars**: Two seminars out of the course list, that have at least 3 CP each and are offered by a representative of the Department of Economics and Management or of the Center for applied legal studies (Department of Informatics), have to be chosen.

- Alternatively one of the two seminars can be absolved at a engineering department or at the Department of Mathematics. The seminar has to be offered by a representative of the respective department as well. The assessment has to meet the demands of the Department of Economics and Management (active participation, term paper with a workload of at least 80 h, presentation). This alternative seminar requires an official approval and can be applied at the examination office of the Department of Economics and Management. Seminars at the institutes wbk and IFL do not require these approval.

- **Key Qualification (KQ)-course(s)**: One or more courses with at least 3 CP in total of additional key qualifications have to be chosen among the courses [HoC, ZAK, Sprachenzentrum].

**Qualification Objectives**

- 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.

**Content**
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor. Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailed description of these qualifications is given in the section “Key Qualifications” of the module handbook. Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

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

**Remarks**
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. The courses “Seminar Human Resource Management” [2573011] and “Seminar Human Resources and Organizations” [2573010] have both been added summer 2015.
**Module: Internship [WI3EXPRAK]**

**Responsibility:** Der Vorsitzende des Prüfungsausschusses

<table>
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<tr>
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<th>Course</th>
<th>ECTS</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>T-WIWI-102611</td>
<td>Internship (S. 491)</td>
<td>8,0</td>
<td>Der Vorsitzende des Prüfungsausschusses</td>
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</tbody>
</table>

### Learning Control / Examinations

The assessment is carried out by the evidence of completed full-time internships of at least eight weeks and a presentation of the internship in the form of a written report on the activities.

1. Information on evidence of completed full-time internships:

The internship is proofed by the certificate of the intern’s office. The certificate has to be formally correct with official corporate letterhead and handwritten countersigned by a responsible employee of the company.

The certificate must at least contain the following information:

- Company / Location
- Duration: from ... to ...
- Hours of work (weekly)
- Working interruption, indicating the vacation and sick days
- Department
- Headwords to the activities

2. Information on to the presentation:

The internship report should be at least one page (typewritten, not handwritten) for each Location. It must be countersigned by a representative of the intern’s office.

### Conditions

Internships, that were completed even before studying may be recognized, if the criteria for recognition are met. After recognition of the compulsory internship, there can be taken a semester off for a voluntary, student-related internship. The possibility is particularly interesting in view of the master programme, which requires internships of at least 12 weeks.

Regarding to the election of the company, in which the internship is completed, there are no specific rules. With a view to the future professional career, it is recommended to absolve the internship in a larger, possibly international company.

### Qualification Objectives

- has general insight into the essential processes in a company,
- is in a position to identify operation correlations and has the knowledge and skills to facilitate a fast understanding of the processes in the company,
- in addition to practical professional experience and competences, also has key competences such as own initiative, ability to work in a team and communication skills as well as ability to integrate into corporate hierarchies and procedures,
- has the experience to accomplish complex IT and business tasks under realistic conditions within the framework of the relevant legal aspects and while applying the total acquired knowledge (interlaced thinking),
- has an idea of the professional development potential in the economy through pursuit of study-related activities,
- knows the technical and professional requirements in the individually targeted future occupation and can take this knowledge into account for the future planning of his/her studies and career,
- can assess and estimate own technical and professional strengths and weaknesses through his/her evaluation of the company.
Content
The internship may be done in economic, business and/or technical companies. At best, it is done on activities which are located at the intersection of the two fields - getting to know the specific requirements of Industrial Engineering and Management. A commercial internship provides an insight into business or administrative processes of business transactions. Therefor departments such as controlling, organizing, marketing and planning appear particularly suitable. Work experiences in the departments of engineering, work preparation and provision of material or IT cover more technical aspects of the internship. But work experiences in an engineering firm go with a technical internship. It remains the companies and interns left, which stations and areas the intern will eventually go through. But the focus should always be in accordance with operational realities of the company.

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

Remarks
Vacation days are not figured into the internship. Only three sick leave days may incurred at all. Any additional sick days are not figured into the internship. A relevant vocational education of at least two years is accepted as a performance equivalent to the internship.
Part VIII
Module component exams

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

Responsibility: Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS 4 Language deutsch/englisch/englisch Version 1

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<tr>
<th>Term</th>
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<th>Events</th>
<th>Type</th>
<th>SWS</th>
<th>Lecturers</th>
</tr>
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<tbody>
<tr>
<td>SS 2016</td>
<td>2513306</td>
<td>Event Processing: Processing of Real-Time Data and their Business Potential</td>
<td>Seminar / Praktikum (S/P)</td>
<td>2</td>
<td>Ljiljana Stojanovic, Rudi Studer, Suad Sejdovic, Dominik Riemer, York Sure-Vetter</td>
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<tr>
<td>WS 16/17</td>
<td>2512200</td>
<td>Praktikum Betriebliche Informationssysteme: Moderne Technologien der Softwareentwicklung im Einsatz</td>
<td>Praktikum (P)</td>
<td>3</td>
<td>Meike Ullrich, Andreas Fritsch, Andreas Schoknecht, Andreas Oberweis, Murat Citak</td>
</tr>
<tr>
<td>WS 16/17</td>
<td>2512100</td>
<td>Security</td>
<td>Praktikum (P)</td>
<td>4</td>
<td>Kaibin Bao, Aditya Mogadala, Achim Rettinger, Rudi Studer, York Sure-Vetter, Andreas Thalhammer</td>
</tr>
<tr>
<td>SS 2016</td>
<td>2512300</td>
<td>Knowledge Discovery and Data Mining</td>
<td>Seminar / Praktikum (S/P)</td>
<td>3</td>
<td>Tobias Weller, Matthias Frank, Achim Rettinger, Rudi Studer, Maria Maleshkova, York Sure-Vetter</td>
</tr>
<tr>
<td>SS 2016</td>
<td>2512200</td>
<td>Praktikum Betriebliche Informationssysteme: Softwareanwendungen im Geschäftsprozessmanagement</td>
<td>Praktikum (P)</td>
<td>3</td>
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<td>WS 16/17</td>
<td>2512307</td>
<td>Applications of Semantic MediaWiki</td>
<td>Seminar / Praktikum (S/P)</td>
<td>3</td>
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<td>SS 2016</td>
<td>2512100</td>
<td>Optimierung in der Lehre</td>
<td>Praktikum (P)</td>
<td>4</td>
<td>Pradyumn Kumar Shukla, Michael Meier, Andreas Drescher, Andreas Oberweis, Frederic Toussaint</td>
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<td>SS 2016</td>
<td>2512101</td>
<td>Praktikum Betriebliche Informationssysteme: Realisierung innovativer Dienste für Studierende</td>
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<td>Praktikum (P)</td>
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<td>WS 16/17</td>
<td>2512301</td>
<td>Linked Open Data basierte Web 3.0 Anwendungen und Services</td>
<td>Seminar / Praktikum (S/P)</td>
<td>3</td>
<td>Tobias Christof Käfer, Rudi Studer, Maribel Acosta Deibe, Andreas Harth, York Sure-Vetter</td>
</tr>
</tbody>
</table>
Learning Control / Examinations
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.

Conditions
None

Remarks
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.

Die folgenden Informationen stammen aus der Veranstaltung Event Processing: Processing of Real-Time Data and their Business Potential (SS 2016):

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

- Prediction of lucrative areas / routes
- Real-time visualization of event streams
- Fraud Detection
- Sales forecast

Gladly, data with other data (e.g.weather or event data for NYC) can be linked.

Die folgenden Informationen stammen aus der Veranstaltung Knowledge Discovery and Data Mining (SS 2016):

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

Die folgenden Informationen stammen aus der Veranstaltung Applications of Semantic MediaWiki (WS 16/17):

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

- Analysis of Medical Processes
- Correlation analysis of medical data
- Visualization of data in SMW
- Sentiment analysis of Twitter data
- Upload Interface for SMW
- Process Matching of process data

Die folgenden Informationen stammen aus der Veranstaltung Linked Open Data basierte Web 3.0 Anwendungen und Services (WS 16/17):

Workload
Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media
Course: Advanced Programming - Application of Business Software [T-WIWI-102748]

Responsibility: Stefan Klink, Andreas Oberweis

Contained in: [M-WIWI-101399] Emphasis Informatics

ECTS

Language

Version

5
deutsch
1

Events

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<tr>
<td>WS 16/17</td>
<td>2511026</td>
<td>Advanced Programming - Application of Business Software</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Stefan Klink</td>
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<tr>
<td>WS 16/17</td>
<td>2511027</td>
<td>Übungen zu Programmierung kommerzieller Systeme - Einsatz betrieblicher Standard-Software</td>
<td>Übung (Ü)</td>
<td>1</td>
<td>Meike Ullrich, Stefan Klink, Murat Citak</td>
</tr>
</tbody>
</table>

Learning Control / Examinations

The assessment consists of a written examination of 2 hours (Section 4 (2), 1 of the examination regulations) and of assignments during the course (Section 4 (2), 3 SPO 2007 respectively Section 4 (3) SPO 2015).

Successful participation to the computer lab is precondition for permission to the assessment. Further information will be given at the first lesson and via the homepage of the course.

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

Conditions

This course cannot be taken together with Advanced Programming - Java Network Programming [2511020].

Modeled Conditions

The following conditions must be met:

- Course [T-WIWI-102747] Advanced Programming - Java Network Programming and this course are mutually exclusive.

Recommendations

Knowledge of the course “Grundlagen der Informatik I und II” are helpful.

Die folgenden Informationen stammen aus der Veranstaltung Advanced Programming - Application of Business Software (WS 16/17):

Students

- explain basic concepts and principles of enterprise information systems,
- describe the components of enterprise information systems,
- assess economical aspects of such systems,
- apply standard software for modelling business processes and for analysing them to given criteria.

Content

Business information systems enable, support, and accelerate new forms of business processes and forms of organisation. They are the central infrastructure of the economy in the age of eBusiness. Thus, basic knowledge is given in lectures, in exercises and in the computer lab which deals with installation, configuration and parameterization of business information systems. The course communicates profound knowledge in following topics:

- Analysis of cooperation scenarios and business process scenarios
- Selection of modelling methods according to defined criteria
- Implementation of business process models and cooperation models with the help of standard software
- Identification and assessment of challenges during the installation of information systems
- Economical evaluation of business information systems.

Workload

Lecture 30h
Exercise course 17h
Review and preparation of lectures 30h
Review and preparation of exercises 15h
Computer Lab 30h
Exam preparation 29h
Exam 1h
Total 150 h
Exercise courses are done by student tutors (size about 50 students)

**Literature**


Further literature will be given during the course.
### Course: Advanced Programming - Java Network Programming [T-WIWI-102747]

**Responsibility:** Dietmar Ratz  
**Contained in:** [M-WIWI-101399] Emphasis Informatics

<table>
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<td>Advanced Programming - Java Network Pro-</td>
<td>Vorlesung (V)</td>
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<td>gramming</td>
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#### Learning Control / Examinations

The assessment consists of a written exam (90 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the compulsory tests in the computer lab is prerequisite for admission to the written exam. Further information about attendance to the exercises and practical terms will be announced in the first lecture and at the lecture homepage. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

#### Conditions

This course cannot be taken together with Advanced Programming - Application of Business Software [2511026].

#### Modeled Conditions

The following conditions must be met:

- Course [T-WIWI-102748] Advanced Programming - Application of Business Software and this course are mutually exclusive.

---

Die folgenden Informationen stammen aus der Veranstaltung Advanced Programming - Java Network Programming (SS 2016):

#### Content

see German version

#### Workload

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

#### Literature


#### Elective literature:

- Further references will be given in the lecture.
Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsibility: Kay Mitisch, Marten Hillebrand

Contained in: [M-WIWI-101501] Economic Theory

ECTS: 4,5

Version: 1

Learning Control / Examinations
The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the beginning of the recess period or at the beginning of the following semester.

Conditions
None

Recommendations
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.
**Course: Airport Logistics [T-MACH-105175]**

**Responsibility:** André Richter  
**Contained in:** [M-MACH-101269] Introduction to Technical Logistics

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### Events

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<td>2117056</td>
<td>Airport logistics</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>André Richter</td>
</tr>
</tbody>
</table>

### Conditions

none

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**Die folgenden Informationen stammen aus der Veranstaltung Airport logistics (WS 16/17):**

Students are able to:

- Describe material handling and informations technology activities on airports,
- Evaluate processes and systems on airports as the law stands, and
- Choose appropriate processes and material handling systems for airports.

### Content

Introduction  
airport installations  
luggage transport  
passenger transport  
security on the airport  
legal bases of the air traffic  
freight on the airport

### Workload

regular attendance: 21 hours  
self-study: 99 hours

### Literature

None.
Course: Algorithms for Internet Applications [T-WIWI-102658]

Responsibility: Hartmut Schmeck

Contained in:
- [M-WIWI-101399] Emphasis Informatics
- [M-WIWI-101426] Electives in Informatics
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

ECTS 5
Language englisch
Version 1

Events

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<tbody>
<tr>
<td>WS 16/17</td>
<td>2511103</td>
<td>Übungen zu Algorithms for Internet Applica-</td>
<td>Übung (Ü)</td>
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<td>Hartmut Schmeck, Jan Müller, Kaibin Bao</td>
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<tr>
<td>WS 16/17</td>
<td>2511102</td>
<td>Algorithms for Internet Applications</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Hartmut Schmeck</td>
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</table>

Learning Control / Examinations
The examination will be offered latest until summer term 2017 (repeaters only). The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination (called “bonus exam”, 45 min) (according Section 4(2), 3 of the examination regulation).
The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

Remarks
This course will not be offered after WS 2016/17

Die folgenden Informationen stammen aus der Veranstaltung Algorithms for Internet Applications (WS 16/17):
The students will learn to master methods and concepts of essential algorithms within Internet applications and to develop capabilities for innovative improvements. The course aims at teaching advanced concepts for the design and application of algorithms with respect to the requirements in networked systems. Based on a fundamental understanding of taught concepts and methods the students should be able to select appropriate concepts and methods for problem settings in their future professional life, and - if necessary - customize and apply them in an adequate way. The students will be capable to find appropriate arguments for their chosen approach to a problem setting.
In particular, the student will

- know the structure and elementary protocols of the Internet (TCP/IP) and standard routing algorithms (distance vector and link state routing),
- know methods of information retrieval in the WWW, algorithms for searching information and be able to assess the performance of search engines,
- know how to design and use cryptographic methods and protocols to guarantee and check confidentiality, data integrity and authenticity,
- know algorithmic basics of electronic payment systems and of electronic money.

Content
Internet and World Wide Web are changing our world, this core course provides the necessary background and methods for the design of central applications of the Internet. After an introduction into Internet technology the following topics are addressed: information retrieval in the www, structure and functioning of search engines, foundations of secure communication, electronic payment systems and digital money, and - if time permits - security architectures.

Workload
The total workload for this course is approximately 150.0 hours. For further information see German version.

Literature

Elective literature:
- Further references will be given in the course.
Course: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

Responsibility: Marcus Gohl
Contained in: [M-MACH-101303] Combustion Engines II

ECTS 4 Language deutsch Version 1

Events

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<td>2134150</td>
<td>Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Marcus Gohl</td>
</tr>
</tbody>
</table>

Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines (SS 2016):

The Students can point out the challenges concerning the current emission standards in engine development. They can name and explain the basic principles of measurement techniques and methods to analyse exhaust gas components and components of engine oil. Hence, the students have the ability to choose the right methods for a given Problem and to interpret the results.

Content

The students get involved in the application of different measurement techniques in the field of exhaust gas and lubricating oil analysis. The functional principles of the systems as well as the application areas of the latter are discussed. In addition to a general overview of standard applications, current specific development and research activities are introduced.

Workload

regular attendance: 24 hrs
self study: 96 hrs

Literature

The lecture documents are distributed during the courses.
Course: Analysis of multivariate Data [T-WIWI-103063]

Responsibility: Oliver Grothe

Contained in: [M-WIWI-101599] Statistics and Econometrics

Learning Control / Examinations
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.

Conditions
None

Recommendations
It is recommended to attend the courses Statistics 1 [2600008] und Statistics 2 [2610020] in advance.

Remarks
The lecture is offered irregularly. The curriculum of the next three years is available online.
The students can name and explain state-of-the-art methods to analyse the process in combustion as well as special measuring techniques such as optical and laser analysis. They are able to thermodynamically model, analyse and evaluate the engine process.

**Content**
- energy balance at the engine
- energy conversion in the combustion chamber
- thermodynamics of the combustion process
- flow velocities
- flame propagation
- special measurement techniques

**Workload**
- regular attendance: 24 hours
- self-study: 96 hours

**Literature**
Lecture notes available in the lectures
Course: Analytical CRM [T-WIWI-102596]

Responsibility: Andreas Geyer-Schulz

Contained in: [M-WIWI-101460] CRM and Service Management
[M-WIWI-101422] Specialization in Customer Relationship Management

ECTS 4,5 Language deutsch Version 1

Events

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<td>WS 16/17</td>
<td>2540522</td>
<td>Operatives CRM</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Andreas Geyer-Schulz, Andreas Sonnenbichler</td>
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<td>WS 16/17</td>
<td>2540523</td>
<td>Übung Operatives CRM</td>
<td>Übung (U)</td>
<td></td>
<td>Victoria-Anne Schweigert, Andreas Sonnenbichler</td>
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</table>

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulations and by submitting written papers as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Conditions
None

Recommendations
We expect knowledge about data models and the UML modelling language concerning information systems.

Remarks
The lecture ultimately takes place in summer term of 2014. Afterwards the lecture is hold in alternation with “2540520 - Operative CRM”. The current schedule can be seen on the chair’s website (http://www.em.uni-karlsruhe.de/studies/).

Die folgenden Informationen stammen aus der Veranstaltung Operatives CRM (WS 16/17):

Content
The Student
- understands the theory of methods for process and data analyses and applies them for the design and implementation of operative CRM-processes in the complex context of companies,
- takes privacy problems into account,
- evaluates existing operative CRM-processes in companies and gives recommendation for their improvement. This requires the knowledge of example processes and the ability to transform them according to the given setting.
- uses literature for the solution of case studies, communicates with professionals and summarizes his recommendations and drafts in precise and coherent texts.
Course: Applied Informatics I - Modelling [T-WIWI-102652]

Responsibility: Andreas Oberweis, York Sure-Vetter

Contained in: [M-WIWI-101399] Emphasis Informatics
[M-WIWI-101426] Electives in Informatic

ECTS 5  Language deutsch  Version 1

Events

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<td>2511030</td>
<td>Applied Informatics I - Modelling</td>
<td>Vorlesung (V)</td>
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<td>Andreas Oberweis, York Sure-Vetter Steffen Thoma, Andreas Schoknecht, Andreas Oberweis</td>
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<td>WS 16/17</td>
<td>2511031</td>
<td>Exercises to Applied Informatics I - Modelling</td>
<td>Übung (Ü)</td>
<td>1</td>
<td>Andreas Oberweis, York Sure-Vetter Steffen Thoma, Andreas Schoknecht, Andreas Oberweis</td>
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</table>

Learning Control / Examinations

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).

Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Applied Informatics I - Modelling (WS 16/17):

Students

- explain the strengths and weaknesses of various modeling approaches for Information Systems and choose an appropriate method for a given problem,
- create UML models, ER models and Petri nets for given problems,
- model given problems in Description Logics and apply description logic rules,
- describe the main ontology concepts and languages and explain SPARQL queries,
- create and evaluate a relational database schema and express queries in relational algebra.

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 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:

Course: Applied Informatics II - IT Systems for eCommerce [T-WIWI-102651]

Responsibility: Johann Marius Zöllner

Contained in:
- [M-WIWI-101399] Emphasis Informatics
- [M-WIWI-101426] Electives in Informatics
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

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<td>Applied Informatics II - IT Systems for e-Commerce</td>
<td>Vorlesung (V)</td>
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<td>Ingo Scholtes</td>
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<td>SS 2016</td>
<td>2511033</td>
<td>Übungen zu Angewandte Informatik II: Informatiksysteme für eCommerce</td>
<td>Übung (U)</td>
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<td>Andreas Schoknecht, Ingo Scholtes</td>
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Learning Control / Examinations

The assessment consists of a written exam (120 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the compulsory exercises is prerequisite for the admission to the written exam. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions

None

Recommendations

Knowledge of content of the modules Foundations in Informatics [IW1INF1] and Algorithms I [IW2INF2] is expected.

Die folgenden Informationen stammen aus der Veranstaltung Applied Informatics II - IT Systems for eCommerce (SS 2016):

The student learns about concepts and technologies for designing big, distributed application architectures. Students apply industry-relevant technology to solve application-oriented problems in lab classes.

Content

The course Applied Informatics II [2511032] covers various facets of electronic commerce which have to be supported by adequate and efficient distributed information systems. Key topics are middleware technologies and distributed application architectures. Document description and exchange (incl. XML), Java EE, Web technologies, and Web services are additional topics.

Workload

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

Literature

Tba in the lecture.
Course: Asset Management [T-WIWI-102879]

Responsibility: Andreas Sauer

Contained in: [M-WIWI-101465] Topics in Finance I
[M-WIWI-101423] Topics in Finance II

ECTS 3  Language deutsch  Version 1

Events

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<td>2530219</td>
<td>Asset Management</td>
<td>Vorlesung (V)</td>
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<td>Andreas Sauer</td>
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Learning Control / Examinations
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.

Conditions
None

Recommendations
Proficiency of the topics covered in the course “Investments” is required.

Die folgenden Informationen stammen aus der Veranstaltung Asset Management (WS 16/17):
Students are able to name the terms and definitions of professional asset management. They are able to structure, formally describe and analyze problems of professional asset management. Students are in a position to apply the instruments and methods of asset management.

Content
The course familiarizes students with the instruments, methods and terms of professional asset management. It conveys the knowledge of applying the relevant methods to students via practical exercises.

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

Literature
Investments and Portfolio Management,
Zvi Bodie, Alex Kane, Alan J. Marcus,
The Theory and Practice of Investment Management: Asset Allocation, Valuation, Portfolio Construction, and Strategies
Frank J. Fabozzi, Harry Markowitz
John Wiley & Sons; 2. Auflage (2011)
Course: Auction & Mechanism Design [T-WIWI-102876]

Responsibility: Nora Szech

Contained in: [M-WIWI-101499] Applied Microeconomics
[M-WIWI-101501] Economic Theory

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<td>2560550</td>
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<td>SS 2016</td>
<td>2560551</td>
<td>Übung zu Auction and Mechanism Design</td>
<td>Übung (U)</td>
<td>1</td>
<td>Nora Szech</td>
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Learning Control / Examinations
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.
Students can earn a bonus to the final grade by successfully participating in the exercises.

Conditions
None

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

Remarks
The lecture will be held in English.

Die folgenden Informationen stammen aus der Veranstaltung Auction and Mechanism Design (SS 2016):
The students
- can analyze strategic behavior in auctions;
- can compare auction formats with regard to efficiency and revenue;
- are familiar with the basic theory of (Bayesian) mechanism design;
- master the revenue equivalence theorem for standard auctions;
- can apply mechanism design to one object auctions and bilateral trade.

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.

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

Literature
<table>
<thead>
<tr>
<th>Course: Automation of Power Grids [T-ETIT-101927]</th>
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<tr>
<td>Responsibility: N.N.</td>
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<tr>
<td>Contained in: [M-ETIT-101165] Energy Generation and Network Components</td>
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<tr>
<th>Conditions</th>
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</table>
Course: Automotive Engineering [T-MACH-100092]

Responsibility: Hans-Joachim Unrau, Frank Gauterin

Contained in: [M-MACH-101266] Automotive Engineering

ECTS: 6
Language: deutsch
Version: 1

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<td>WS 16/17</td>
<td>2113805</td>
<td>Automotive Engineering I</td>
<td>Vorlesung (V)</td>
<td>4</td>
<td>Hans-Joachim Unrau, Frank Gauterin</td>
</tr>
</tbody>
</table>

Modeled Conditions
The following conditions must be met:
- Course [T-MACH-102203] Automotive Engineering I and this course are mutually exclusive.

Die folgenden Informationen stammen aus der Veranstaltung Automotive Engineering I (WS 16/17):
The students know the movements and the forces at the vehicle and are familiar with active and passive security. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to judge and to develop the complex system “vehicle”.

Content
1. History and future of the automobile
2. Driving mechanics: driving resistances and driving performances, mechanics of the longitudinal and transverse forces, passive safety
3. Engines: combustion engine, alternative drives (e.g. electric motor, fuel cell)
4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)
5. Power transmission and distribution: drive shafts, cardan joints, differentials

Workload
regular attendance: 45 hours
self-study: 195 hours

Literature
Course: Automotive Engineering I [T-MACH-102203]

Responsibility: Martin Gießler, Frank Gauterin

Contained in: [M-MACH-101266] Automotive Engineering

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<td>WS 16/17</td>
<td>2113809</td>
<td>Automotive Engineering I</td>
<td>Vorlesung (V)</td>
<td>4</td>
<td>Martin Gießler, Frank Gauterin</td>
</tr>
</tbody>
</table>

Conditions
Examination in English
Can not be combined with lecture [2113805] Grundlagen der Fahrzeugtechnik I.

Modeled Conditions
The following conditions must be met:
- Course [T-MACH-100092] Automotive Engineering and this course are mutually exclusive.

Die folgenden Informationen stammen aus der Veranstaltung Automotive Engineering I (WS 16/17):

The students know the movements and the forces at the vehicle and are familiar with active and passive security. They have proper knowledge about operation of engines and alternative drives, the necessary transmission between engine and drive wheels and the power distribution. They have an overview of the components necessary for the drive and have the basic knowledge, to analyze, to judge and to develop the complex system "vehicle".

Content
1. History and future of the automobile
2. Driving mechanics: driving resistances and driving performances, mechanics of the longitudinal and transverse forces, passive safety
3. Engines: combustion engine, alternative drives (e.g. electric motor, fuel cell)
4. Transmission: clutches (e.g. friction clutch, visco clutch), transmission (e.g. mechanical transmission, hydraulic fluid transmission)
5. Power transmission and distribution: drive shafts, cardon joints, differentials

Workload
regular attendance: 45 hours
self-study: 195 hours

Literature
3. Gnadler, R.: Script to the lecture 'Automotive Engineering I'
Course: Automotive Engineering II [T-MACH-102117]

Responsibility: Hans-Joachim Unrau, Frank Gauterin

Contained in: [M-MACH-101266] Automotive Engineering

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<td>SS 2016</td>
<td>2114835</td>
<td>Automotive Engineering II</td>
<td>Vorlesung (V)</td>
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<td>Hans-Joachim Unrau</td>
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</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Automotive Engineering II (SS 2016):

The students have an overview of the modules, which are necessary for the road holding of a motor vehicle and the power transmission between vehicle bodywork and roadway. They have knowledge of different wheel suspensions, the tyres, the steering elements and the brakes. They know different execution forms, the function and the influence on the driving or brake behavior. They are able to develop the appropriate components correctly. They are ready to analyze, to judge and to optimize the complex relationship of the different components under consideration of boundary conditions.

Content
1. Chassis: Wheel suspensions (rear axles, front axles, kinematics of axles), tyres, springs, damping devices
2. Steering elements: Manual steering, servo steering, steer by wire
3. Brakes: Disc brake, drum brake, retarder, comparison of the designs

Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature


3. Gnadler, R.: Script to the lecture ‘Automotive Engineering II’
Course: Automotive Logistics [T-MACH-105165]

Responsibility: Kai Furmans

Contained in: [M-MACH-101269] Introduction to Technical Logistics

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<td>2118085</td>
<td>Automotive Logistics</td>
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<td>Kai Furmans</td>
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</table>

Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Automotive Logistics (SS 2016):

Students are able to:

- Describe essential logistic questions, in a complex production network. As an example the automobile industry is used.
- Choose and apply solution possibilities for logistic problems in this area.

Content

- Logistic questions within the automobile industry
- basic model of automobile production and distribution
- relation with the suppliers
- Disposition and physical execution
- Vehicle production in the interaction of shell, paint shop and assembly
- Sequence planning
- Assembly supply
- vehicle distribution and linkage with selling processes
- Physical execution, planning and control

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

None.
<table>
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<tr>
<th><strong>Course:</strong> Bachelor Thesis [T-WIWI-103067]</th>
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<td><strong>Responsibility:</strong> Martin Ruckes</td>
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<td><strong>Contained in:</strong> [M-WIWI-101601] Module Bachelor Thesis</td>
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**Learning Control / Examinations**  
see module description

**Conditions**  
see module description
Course: Basic Principles of Economic Policy [T-WIWI-103213]

Responsibility: Ingrid Ott

Contained in: [M-WIWI-101668] Economic Policy I

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Learning Control / Examinations

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.

Conditions

None

Recommendations

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

Die folgenden Informationen stammen aus der Veranstaltung Basic Principles of Economic Policy (SS 2016):

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

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

Workload

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

Literature

See announcements to the lecture
Course: Basics of Technical Logistics [T-MACH-102163]

Responsibility: Vladimir Madzharov, Martin Mittwollen

Contained in: [M-MACH-101269] Introduction to Technical Logistics

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<td>2117095</td>
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Die folgenden Informationen stammen aus der Veranstaltung Basics of Technical Logistics (WS 16/17):

Students are able to:

- Describe processes and machines of technical logistics,
- Model the fundamental structures and the impacts of material handling machines with mathematical models,
- Refer to industrially used machines and
- Model real machines applying knowledge from lessons and calculate their dimensions.

Content

Bases effect model of conveyor machines made for the change of position and orientation; conveyor processes; identification systems; drives; mechanical behaviour of conveyors; structure and function of conveyor machines; elements of intralogistics

sample applications and calculations in addition to the lectures inside practical lectures

Workload

presence: 42h
rework: 198h

Literature

Recommendations during lessons
Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I [T-MACH-100966]

Responsibility: Andreas Guber
Contained in: [M-WIWI-101404] Extracurricular Module in Engineering

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<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I</td>
<td>Vorlesung (V)</td>
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Die folgenden Informationen stammen aus der Veranstaltung BioMEMS - Microsystems Technologies for Life-Sciences and Medicine I (WS 16/17):

The lecture will first address relevant microtechnical manufacturing methods. Then, selected biomedical applications will be presented, as the increasing use of microstructures and microsystems in Life-Sciences and in medicine leads to improved medico-technical products, instruments, and operation and analysis systems.

Content
Introduction into various microtechnical manufacturing methods: LIGA, Micro milling, Silicon Micromachining, Laser Microstructuring, µEDM, Metal-Etching, Biomaterials, Sterilisation.
Examples of use in the life science sector: basic micro fluidic structures: micro channels, micro filters, micromixers, micropumps, microvalves, Micro and nanotiter plates, Microanalysis systems (µTAS), Lab-on-chip applications.

Workload
Literature: 20 h
Lessons: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

Literature
Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005
M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011
**Course: BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II [T-MACH-100967]**

**Responsibility:** Andreas Guber

**Contained in:**
- [M-WIWI-101404] Extracurricular Module in Engineering
- [M-MACH-101287] Microsystem Technology

**ECTS 3**  
**Language deutsch**  
**Version 1**

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Die folgenden Informationen stammen aus der Veranstaltung BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II (SS 2016):

The lecture will first shortly address some relevant microtechnical manufacturing methods. Then, selected biomedical applications will be presented, as the increasing use of microstructures and microsystems in Life-Sciences und in medicine leads to improved medico-technical products, instruments, and operation and analysis systems.

**Content**

Examples of use in Life-Sciences and biomedicine: Microfluidic Systems: LabCD, Protein Cristallisation  
Microarrays  
Tissue Engineering  
Cell Chip Systems  
Drug Delivery Systems  
Micro reaction technology  
Microfluidic Cells for FTIR-Spectroscopy  
Microsystem Technology for Anesthesia, Intensive Care and Infusion  
Analysis Systems of Person´s Breath  
Neurobionics and Neuroprosthesis  
Nano Surgery

**Workload**

- Literature: 20 h  
- Lessons: 21 h  
- Preparation and Review: 50 h  
- Exam preparation: 30 h

**Literature**

Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II; Springer-Verlag, 1994

M. Madou: Fundamentals of Microfabrication
The lecture will first shortly address some relevant microtechnical manufacturing methods. Then, selected biomedical applications will be presented, as the increasing use of microstructures and microsystems in Life-Sciences and medicine leads to improved medico-technical products, instruments, and operation and analysis systems.

**Content**

Examples of use in minimally invasive therapy

Minimally invasive surgery (MIS)

Endoscopic neurosurgery

Interventional cardiology

**NOTES**

OP-robots and Endosystems

License of Medical Products and Quality Management

**Workload**

Literature: 20 h

Lessons: 21 h

Preparation and Review: 50 h

Exam preparation: 30 h

**Literature**

Menz, W., Mohr, J., O. Paul: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 2005

Buess, G.: Operationslehre in der endoskopischen Chirurgie, Band I und II; Springer-Verlag, 1994

M. Madou

Fundamentals of Microfabrication
The students should be able analyze, judge, plan and develop biomimetic strategies and products.

**Content**
Bionics focuses on the design of technical products following the example of nature. For this purpose we have to learn from nature and to understand its basic design rules. Therefore, the lecture focuses on the analysis of the fascinating effects used by many plants and animals. Possible implementations into technical products are discussed in the end.

**Workload**
lectures 30 h
self study 30 h
preparation for examination 30 h

**Literature**
Course: Brand Management [T-WIWI-102798]

Responsibility: Bruno Neibecker

Contained in: [M-WIWI-101424] Foundations of Marketing

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Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).
The examination will be offered latest until winter term 2016/2017 (repeaters only).

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Brand Management (WS 16/17):

Students have learned the following outcomes and competences:

- To specify the key terms in brand management
- To identify and define theoretical constructs in marketing management to build brand value
- To identify the main research trends
- To analyze and interpret high level academic articles
- To learn interactive skills to work in teams and to follow a goal-oriented approach
- To gain understanding of methodological research to develop concrete plans for marketing decision-making

Content
The students should learn the essential scientific and practical principles of Marketing, especially branding. Branding consists of any name, design, style, words or symbols, singly or in any combination that distinguish one product from another in the eyes of the consumer. Brand positioning, brand loyalty and brand equity are discussed as important elements of a management concept. The focus of the course is not limited to short-term ROI, but also long-term benefits of communication strategies facing company’s responsibilities to all of its stakeholders, e.g. consumers, investors and public. The strategies and techniques in branding are broaden by several case studies. English as an international technical language in marketing is practiced with course readings and scientific papers. Content: The course brand management starts with the development of the corporate objectives as the heart of the brand planning process followed by definitions of brand. Setting up on the psychological and social bases of consumer behavior, aspects of an integrated marketing communication are discussed. The students should acquire the particular value of branding strategies. The concept of brand personality is considered in two perspectives, from a practical point of view and the challenging position of the theoretical construct. Methods for the measurement of a consumer-based brand equity are compared with the financial valuation of the brand. The information provided by this equity measurements are related to the equity drivers in brand management. The marketers perspective will be accomplish with the analysis of several case studies. Within the limits of a knowledge based system for advertising evaluation many of the issues accomplished in the course are summarized. At the same time it is discussed as a tool to use marketing knowledge systematically.

Workload
The total workload for this course is approximately 135 hours (4.5 credits).

Literature
Die folgenden Informationen stammen aus der Veranstaltung BUS-Controls (SS 2016):

The students will get an overview of the theoretic and practical functioning of different bus systems.

After the practical oriented lessons the students will be able to visualize the communication structure of different applications, design basic systems and evaluate the complexity of programming of the complete system.

Content

• Knowledge of the basics of data communication in networks
• Overview of the operating mode of current field buses
• Explicit observation of the operating mode and application areas of CAN buses
• Practical programming of an example application (hardware is provided)

Workload

• regular attendance: 21 hours
• self-study: 92 hours

Literature

Elective literature:

Course: Business Administration: Finance and Accounting [T-WIWI-102819]

Responsibility: Marliese Uhrig-Homburg, Martin Ruckes

Contained in: [M-WIWI-101494] Fundamentals of Business Administration 1

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<td>Martin Ruckes</td>
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Learning Control / Examinations
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation. The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None

Remarks
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.

Die folgenden Informationen stammen aus der Veranstaltung Business Administration: Finance and Accounting (WS 16/17):

Students
- are able to valuate bonds and cash flows in general,
- can valuate stocks,
- can make investment decisions,
- can analyse portfolios,
- are able to recognise business events in financial reports,
- can determine depreciation expenses,
- are able to valuate inventories,
- can analyse costs,
- knows the difference between financial and management accounting,
- knows cost center accounting,
- can estimate product costs.

Content
- **Investment and Finance:**
  - Valuation of Bonds and Stocks
  - Capital Budgeting
  - Portfolio Theory
- **Financial Accounting**
- **Management Accounting**

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

Literature
Extensive bibliographic information will be given in the materials to the lecture.
Course: Business Administration: Production Economics and Marketing [T-WIWI-102818]

Responsibility: Martin Klarmann, Thomas Lützkendorf, Wolf Fichtner, Frank Schultmann, Martin Ruckes

Contained in: [M-WIWI-101578] Fundamentals of Business Administration 2

ECTS 4 Language deutsch Version 1

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<td>SS 2016</td>
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Learning Control / Examinations
The assessment consists of a written exam (90 minutes) according to Section 4(2), 1 of the examination regulation.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Business Administration: Production Economics and Marketing (SS 2016):

Students
- are able to analyse and implement the marketing strategy and marketing measures (marketing mix: 4 Ps),
- can analyse, implement and manage procurement and production processes,
- are able to plan projects, and
- have skills about selected issues in energy economics.

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.

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.
Course: Business Administration: Strategic Management and Information Engineering and Management [T-WIIW-102817]

Responsibility: Petra Nieken, Martin Ruckes

Contained in: [M-WIIW-101494] Fundamentals of Business Administration 1

ECTS: 3
Version: 1

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Learning Control / Examinations
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation. The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None
Course: Business Process Modelling [T-WIWI-102697]

Responsibility: Andreas Oberweis

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS 5 Language deutsch Version 1

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Learning Control / Examinations
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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Business Process Modelling (WS 16/17):

Students
- describe goals of business process modeling and apply different modeling languages,
- choose the appropriate modeling language according to a given context,
- use suitable tools for modeling business processes,
- apply methods for analysing and assessing process models to evaluate specific quality characteristics of the process model.

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.
Course: Business Strategies of Banks [T-WIWI-102626]

Responsibility: Wolfgang Müller

Contained in: [M-WIWI-101465] Topics in Finance I
[M-WIWI-101423] Topics in Finance II

ECTS 3
Language deutsch
Version 1

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Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

Die folgenden Informationen stammen aus der Veranstaltung Business Strategies of Banks (WS 16/17):

Students are are in a position to discuss the principles of commercial banking. They are familiar with fundamental concepts of bank management and are able to apply them.

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
Course: Civil Law for Beginners [T-INFO-103339]

Responsibility: Thomas Dreier

Contained in: [M-INFO-101187] Elective Module Law

ECTS: 4
Version: 1
Course: Climatology [T-PHYS-101092]

Responsibility: Peter Braesicke

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS: 3

Version: 1

Conditions:
none
Course: Combustion Engines I [T-MACH-102194]

Responsibility: Thomas Koch, Heiko Kubach

Contained in: [M-MACH-101275] Combustion Engines I

ECTS 5 Language deutsch Version 1

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Learning Control / Examinations
oral examination, Duration: 25 min., no auxiliary means

Die folgenden Informationen stammen aus der Veranstaltung Combustion Engines I (WS 16/17):

The student can name and explain the working principle of combustion engines. He is able to analyse and evaluate the combustion process. He is able to evaluate influences of gas exchange, mixture formation, fuels and exhaust gas aftertreatment on the combustion performance. He can solve basic research problems in the field of engine development.

Content
Introduction, History, Concepts
Working Principle and Thermodynamics
Characteristic Parameters
Air Path
Fuel Path
Energy Conversion
Fuels
Emissions
Exhaust Gas Aftertreatment

Workload
regular attendance: 32 hours
self-study: 88 hours
Course: Combustion Engines II [T-MACH-104609]

Responsibility: Heiko Kubach

Contained in: [M-MACH-101303] Combustion Engines II

ECTS 5
Language deutsch
Version 1

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Learning Control / Examinations
oral examination, duration: 25 minutes, no auxiliary means

Recommendations
Fundamentals of Combustion Engines I helpful

Die folgenden Informationen stammen aus der Veranstaltung Combustion Engines II (SS 2016):
The students deepen and complement their knowledge from the lecture combustion engines A. they can name and explain construction elements, development tools and latest development trends. They are be able to analyse and evaluate powertrain concepts which are subject of the lecture.

Content
Emissions
Fuels
Drive Train Dynamics
Engine Parts
Boosting
Alternative Powertrain Concepts

Special Engine Concepts

Power Transmission

Workload
regular attendance: 31,5 hours
self-study: 90 hours
Course: Competition in Networks [T-WIWI-100005]

Responsibility: Kay Mitusch

Contained in: [M-WIWI-101422] Specialization in Customer Relationship Management
[M-WIWI-101499] Applied Microeconomics

ECTS: 4,5
Language: deutsch
Version: 1

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Learning Control / Examinations

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.

Recommendations

Basics of microeconomics obtained within the undergraduate programme (B.Sc) of economics are required. Useful, but not necessary, are basic knowledge of industrial economics, principal agent theory, and contract theory.

Die folgenden Informationen stammen aus der Veranstaltung Competition in Networks (WS 16/17):

The Students

- will get a vivid idea of the special characteristics of network industries like telecom, utilities, IT and transport sectors.
- will acquire the basic economic understanding of network industries concerning competition, competitive distortion, state intervention, pricing and financing
- will be able to apply abstract concepts and formal methods to use in these fields

Content

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 of 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.
Course: Computational Economics [T-WIWI-102680]

Responsibility: Simon Caton, Pradyumn Kumar Shukla

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS 4,5 Language englisch Version 1

Events

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<th>Term</th>
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<th>Type</th>
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<th>Lecturers</th>
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<tr>
<td>WS 16/17</td>
<td>2590459</td>
<td>Übungen zu Computational Economics</td>
<td>Übung (U)</td>
<td>1</td>
<td>Pradyumn Kumar Shukla</td>
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<td>WS 16/17</td>
<td>2590458</td>
<td>Computational Economics</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Pradyumn Kumar Shukla</td>
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</tbody>
</table>

Learning Control / Examinations

The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). By successful completion of the exercises (§4(2), 3 SPO 2007 respectively §4(3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The bonus only applies to the first and second exam of the semester in which it was obtained.

Conditions

None

Remarks

This course is offered in cooperation with the Institute of Applied Informatics and Formal Description Models (AIFB).

Die folgenden Informationen stammen aus der Veranstaltung Computational Economics (WS 16/17):

The student

- understands the methods of Computational Economics and applies them on practical issues,
- evaluates agent models considering bounded rational behaviour and learning algorithms,
- analyses agent models based on mathematical basics,
- knows the benefits and disadvantages of the different models and how to use them,
- examines and argues the results of a simulation with adequate statistical methods,
- is able to support the chosen solutions with arguments and can explain them.

Content

Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

Literature


Elective literature:

Die folgenden Informationen stammen aus der Veranstaltung Computer Integrated Planning of New Products (SS 2016):

Der/ die Studierende

- versteht die Standardabläufe im Produktplanungsbereich,
- besitzt grundlegende Kenntnisse über Zusammenhänge, Vorgänge und Strukturelemente als Handlungsleitfaden bei der Planung neuer Produkte,
- besitzt grundlegende Kenntnisse über die Grundlagen und Merkmale der Rapid Prototyping Verfahrenstechnologien,
- versteht die simultane Unterstützung des Produktplanungsprozesses durch entwicklungsbegleitend einsetzbare Rapid Prototyping (RP)-Systeme.

Content

Die Steigerung der Kreativität und Innovationsstärke bei der Planung und Entwicklung neuer Produkte wird u.a. durch einen verstärkten Recheneinsatz für alle Unternehmen zu einer der entscheidenden Einflussgrößen für die Wettbewerbsfähigkeit der Industrie im globalen Wettbewerb geworden ist.

Entsprechend verfolgt die Vorlesung folgende Ziele:

- Das Grundverständnis für Standardabläufe im Produktplanungsbereich erlangen, Kenntnis über Zusammenhänge, Vorgänge und Strukturelemente erwerben und als Handlungsleitfaden bei der Planung neuer Produkte benutzen lernen;
- Kenntnis über die Anforderungen und Möglichkeiten der Rechnerunterstützung erhalten, um die richtigen Methoden und Werkzeuge für die effiziente und sinnvolle Unterstützung eines spezifischen Anwendungsfalles auszuwählen;
- mit den Elementen und Methoden des rechnerunterstützten Ideenmanagements vertraut gemacht werden;
- die Möglichkeiten der simultanen Unterstützung des Produktplanungsprozesses durch entwicklungsbegleitend einsetzbare Rapid Prototyping (RP)-Systeme kennen lernen;

Kenntnis über die Grundlagen und Merkmale dieser RP-Verfahrenstechnologien erwerben und - in Abhängigkeit des zu entwickelnden Produkts - anhand von Beispielen effizient und richtig zur Anwendung bringen können.

Workload

Gesamtaufwand bei 3 Leistungspunkten: ca. 100 Stunden.

- Präsenzzeit: 26 Stunden
- Vor- /Nachbereitung: 26 Stunden
- Prüfung und Prüfungsvorbereitung: 48 Stunden
Course: Constitution and Properties of Wear resistant Materials [T-MACH-102141]

Responsibility: Sven Ulrich
Contained in: [M-MACH-101262] Emphasis Materials Science

ECTS: 4  Language: deutsch  Version: 1

Events

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<td>SS 2016</td>
<td>2194643</td>
<td>Constitution and Properties of Wear resistant materials</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Sven Ulrich</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
oral examination (30 min)

no tools or reference materials

Conditions
none

Die folgenden Informationen stammen aus der Veranstaltung Constitution and Properties of Wear resistant materials (SS 2016):

Basic understanding of constitution of wear-resistant materials, of the relations between constitution, properties and performance, of principles of increasing of hardness and toughness of materials as well as of the characteristics of the various groups of wear-resistant materials.

Content
introduction
materials and wear
unalloyed and alloyed tool steels
high speed steels
stellites and hard alloys
hard materials
hard metals
ceramic tool materials
superhard materials
new developments

Workload
regular attendance: 22 hours
self-study: 98 hours
Literature


Schneider, J.: Schneidkeramik, Verlag moderne Industrie, Landsberg am Lech, 1995

Copies with figures and tables will be distributed
# Course: Construction Technology [T-BGU-101691]

**Responsibility:** Shervin Haghsheno  
**Contained in:** [M-BGU-101004] Fundamentals of construction

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## Events

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<td>SS 2016</td>
<td>6200410</td>
<td>Übungen zu Baubetriebstechnik (bauiBFP6-TMB)</td>
<td>Übung (Ü)</td>
<td>1</td>
<td>Harald Schneider, Shervin Haghsheno, Sascha Gentes</td>
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<td>SS 2016</td>
<td>6200409</td>
<td>Baubetriebstechnik (bauiBFP6-TMB)</td>
<td>Vorlesung (V)</td>
<td>3</td>
<td>Harald Schneider, Shervin Haghsheno, Sascha Gentes</td>
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</table>

## Conditions
none
Die folgenden Informationen stammen aus der Veranstaltung Control Technology (SS 2016):

The students . . .

- are able to name the electrical controls which occur in the industrial environment and explain their function.
- can explain fundamental methods of signal processing. This involves in particular several coding methods, error protection methods and analog to digital conversion.
- are able to choose and to dimension control components, including sensors and actors, for an industrial application, particularly in the field of plant engineering and machine tools. Thereby, they can consider both, technical and economical issues.
- can describe the approach for projecting and writing software programs for a programmable logic control named Simatic S7 from Siemens. Thereby they can name several programming languages of the IEC 1131.

Content
The lecture control technology gives an integral overview of available control components within the field of industrial production systems. The first part of the lecture deals with the fundamentals of signal processing and with control peripherals in the form of sensors and actors which are used in production systems for the detection and manipulation of process states. The second part handles with the function of electric control systems in the production environment. The main focus in this chapter is laid on programmable logic controls, computerized numerical controls and robot controls. Finally the course ends with the topic of cross-linking and decentralization with the help of bus systems.

The lecture is very practice-oriented and illustrated with numerous examples from different branches.

The following topics will be covered

- Signal processing
- Control peripherals
- Programmable logic controls
- Numerical controls
- Controls for industrial robots
- Process control systems
- Field bus
- Trends in the area of control technology

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
Lecture Notes
**Course: Current Topics on BioMEMS [T-MACH-102176]**

**Responsibility:** Andreas Guber  
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering

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**Events**

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<tr>
<td>SS 2016</td>
<td>2143873</td>
<td>Actual topics of BioMEMS</td>
<td>Seminar (S)</td>
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<td>Andreas Guber, Giorgio Cattaneo</td>
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<td>WS 16/17</td>
<td>2143873</td>
<td>Actual topics of BioMEMS</td>
<td>Seminar (S)</td>
<td>2</td>
<td>Andreas Guber</td>
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</table>

*Die folgenden Informationen stammen aus der Veranstaltung Actual topics of BioMEMS (WS 16/17):*

Knowledge in the actual activities in bio-medical and biological technologies under the view of micro technology. The student gets an overview on actual examples of new applications in BioMEMS.  
After successful participation of this seminar the student is able to prepare a new topic in BioMEMS and to present it to an audience.

**Workload**
Active participation on the seminar and preparation of an own presentation of a topic in BioMEMS.  
Lecture time: 21 h  
Preparation: 40 h  
Preparation of own preparation: 60 h
Course: Customer Relationship Management [T-WIWI-102595]

Responsibility: Andreas Geyer-Schulz

Contained in: [M-WIWI-101460] CRM and Service Management

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**Events**

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<td>WS 16/17</td>
<td>2540509</td>
<td>Übung zu CRM</td>
<td>Übung (U)</td>
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<td>Victoria-Anne Schweigert, Andreas Sonnenbichler</td>
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<td>WS 16/17</td>
<td>2540508</td>
<td>Customer Relationship Management</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Andreas Geyer-Schulz, Andreas Sonnenbichler</td>
</tr>
</tbody>
</table>

**Learning Control / Examinations**

Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulations and by submitting written papers as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) of the examination regulation. The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from exercises will be added.

**Conditions**

None

Die folgenden Informationen stammen aus der Veranstaltung Customer Relationship Management (WS 16/17):

The students

- understand service management as an economic basis for Customer Relationship Management and learn the resulting consequences for the management, the organisation itself and their departments,
- design and develop service concepts and service systems at a conceptual level,
- work on case studies in the CRM-area in small groups with limited time,
- learn English as the technical language in the area of CRM and consult international literature from this field for the case studies.

**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). The integration of learning outcomes (Content (content), Skills (skills) with levels and the estimated workload for an average student is intended.

**Literature**


Elective literature:

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

Responsibility: Rheza Nakhaeizadeh
Contained in: [M-WIWI-101599] Statistics and Econometrics

ECTS: 4.5
Version: 1

Events

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<td>SS 2016</td>
<td>2520375</td>
<td>Data Mining and Applications</td>
<td>Vorlesung (V)</td>
<td>2/4</td>
<td>Rheza Nakhaeizadeh</td>
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</table>

Learning Control / Examinations

- Oral examination 70%
- Conduction of a small empirical study 30%

Conditions
None
Course: Database Systems [T-WIWI-102660]

Responsibility: Andreas Oberweis

Contained in: [M-WIWI-101399] Emphasis Informatics
[M-WIWI-101426] Electives in Informatic

ECTS: 5
Language: deutsch
Version: 1

Events

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<td>SS 2016</td>
<td>2511201</td>
<td>Übungen zu Datenbanksysteme</td>
<td>Übung (U)</td>
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<td>Daniel Sommer</td>
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<td>SS 2016</td>
<td>2511200</td>
<td>Database Systems</td>
<td>Vorlesung (V)</td>
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<td>Daniel Sommer</td>
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</table>

Learning Control / Examinations
The assessment consists of an 1h written exam in the first week after lecture period.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Database Systems (SS 2016):

Students
- are familiar with the concepts and principles of data base models, languages and systems and their applications and explain it,
- design and model relational data bases on the basis of theoretical foundations,
- create queries for relational databases,
- know how to handle enhanced data base problems occurring in the enterprises.

Content
Database systems (DBS) play an important role in today’s companies. Internal and external data is stored and processed in databases in every company. The proper management and organization of data helps to solve many problems, enables simultaneous queries from multiple users and is the organizational and operational base for the entire working procedures and processes of the company. The lecture leads in the area of the database theory, covers the basics of database languages and database systems, considers basic concepts of object-oriented and XML databases, conveys the principles of multi-user control of databases and physical data organization. In addition, it gives an overview of business problems often encountered in practice such as:
- Correctness of data (operational, semantic integrity)
- Restore of a consistent database state
- Synchronization of parallel transactions (phantom problem).

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 individually.
Course: Database Systems and XML [T-WIWI-102661]

Responsibility: Andreas Oberweis

Contained in:
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

ECTS: 5
Language: deutsch
Version: 1

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<td>WS 16/17</td>
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<td>Übungen zu Datenbanksysteme und XML</td>
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Learning Control / Examinations
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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Database Systems and XML (WS 16/17):

Students
- know the basics of XML and generate XML documents,
- are able to use XML database systems and to formulate queries to XML documents,
- know to assess the use of XML in operational practice in different application contexts.

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

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

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

Further literature will be given individually.
Course: Decision Theory [T-WIWI-102792]

Responsibility: Karl-Martin Ehrhart

Contained in: [M-WIWI-101499] Applied Microeconomics

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<td>Übungen zu Entscheidungstheorie</td>
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<td>2520365</td>
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<td>Vorlesung (V)</td>
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<td>Karl-Martin Ehrhart</td>
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</table>

Learning Control / Examinations

The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins. The exam is offered each semester.

Conditions

None

Recommendations

Knowledge in mathematics and statistics is required.

Die folgenden Informationen stammen aus der Veranstaltung Decision Theory (SS 2016):

The student will be made familiar with the basics in modern decision making particularly under uncertainty so that she will be able to analyze concrete decision problems and to develop simple solution procedures. By being confronted with experimental results in decision making the student should also be able to evaluate the behavioral part of decision making.

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.

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.
Course: Derivatives [T-WIWI-102643]

Responsibility: Marliese Uhrig-Homburg

Contained in:
- [M-WIWI-101402] eFinance
- [M-WIWI-101465] Topics in Finance I
- [M-WIWI-101423] Topics in Finance II

ECTS: 4,5
Language: deutsch
Version: 1

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<td>SS 2016</td>
<td>2530550</td>
<td>Derivatives</td>
<td>Vorlesung (V)</td>
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</table>

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

Die folgenden Informationen stammen aus der Veranstaltung Derivatives (SS 2016):
The objective of the Derivatives lecture is to become familiar with financial markets, especially derivatives markets. Traded securities and frequently used trading strategies will be introduced. Furthermore the pricing of derivatives will be derived and their use in risk management will be discussed.

Content
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

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

Literature

Elective literature:
Course: Design and Operation of Power Transformers [T-ETIT-101925]

Responsibility: N. N., Mitarbeiter
Contained in: [M-ETIT-101165] Energy Generation and Network Components

ECTS 3  SWS 2  Version 1
Course: Design, Construction and Sustainability Assessment of Buildings I [T-WIWI-102742]

Responsibility: Thomas Lützkendorf


ECTS 4,5 Language deutsch Version 1

Events

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<td>2586405</td>
<td>Übung zu Bauökologie I</td>
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<td>Design and Construction of Buildings</td>
<td>Vorlesung (V)</td>
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<td>Thomas Lützkendorf</td>
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Learning Control / Examinations

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.

Conditions

None

Recommendations

A combination with the module Real Estate Management and with engineering science modules in the area of building physics and structural design is recommended.

Die folgenden Informationen stammen aus der Veranstaltung Design and Construction of Buildings (WS 16/17):

The student

- has an in-depth knowledge of aspects of energy-saving, resource-saving and health-oriented design, construction and operation of buildings (design for environment)
- has a critical understanding of the essential requirements, concepts and technical solutions for green buildings
- is able to integrate aspects of energy-saving, resource-saving and health-conscious construction into a holistic environmental design approach and to assess the advantages and disadvantages of different individual solutions.

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]**

**Responsibility:** Thomas Lützkendorf  
**Contained in:** [M-WIWI-101467] Design, Construction and Sustainability Assessment of Buildings

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### Events

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<td>SS 2016</td>
<td>2585404</td>
<td>Sustainability Assessment of Buildings</td>
<td>Vorlesung (V)</td>
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<td>Benjamin Ströbele, Thomas Lützkendorf</td>
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<td>SS 2016</td>
<td>2585403</td>
<td>Übung zu Bauökologie II</td>
<td>Übung (Ü)</td>
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<td>Benjamin Ströbele</td>
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### Learning Control / Examinations

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.

**Conditions**

None

**Recommendations**

A combination with the module Real Estate Management and with engineering science modules from the areas building physics and structural design is recommended.

Die folgenden Informationen stammen aus der Veranstaltung Sustainability Assessment of Buildings (SS 2016):

The student

- has an in-depth knowledge of the classification of environmental design and construction of buildings within the overall context of sustainability  
- has a critical understanding of the main theories and methods of assessing the environmental performance of buildings  
- is able to use methods and tools to evaluate the environmental performance in design and decision processes or to interpret existing results

**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.
**Course: Document Management and Groupware Systems [T-WIWI-102663]**

**Responsibility:** Stefan Klink

**Contained in:**
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

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<td>SS 2016</td>
<td>2511212</td>
<td>Document Management and Groupware Systems</td>
<td>Vorlesung (V)</td>
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<td>Stefan Klink</td>
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</table>

**Learning Control / Examinations**
The assessment consists of a 1h written exam in the first week after lecture period according to Section 4(2), 1 of the examination regulation.

**Conditions**
None


Students master the basics of integration and structure of document management systems (DMS) and know the complete DMS process - from document capture of the archiving until retrieval. Students know how to realize operative workflows. They know which activities are needed to carry out the conceptual design and installation of DMS and they are able to apply a DMS as an archive system, workflow system and retrieval system. Furthermore, they know groupware systems exemplarily and can use them for collaborative tasks.

**Content**
The lecture gives basics of document management and groupware systems. It covers different system categories, their interaction and their use areas and illustrates this with concrete examples. These include document management in the strict sense, scanning, Document Imaging (acquisition and visualization of scanned documents), indexing, electronic archiving, retrieval of relevant documents, workflow, groupware, and office communications.

**Workload**
Workload: 120h overall,
Lecture 30h
Review and preparation of lectures 60h
Exam preparation 29h
Exam 1h

**Literature**

Further literature is given in each lecture individually.
Course: Economics and Behavior [T-WIWI-102892]

Responsibility: Nora Szech

Contained in: [M-WIWI-101499] Applied Microeconomics
[M-WIWI-101501] Economic Theory

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<td>Economics and Behavior</td>
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<td>WS 16/17</td>
<td>2560138</td>
<td>Übung zu Economics and Behavior</td>
<td>Übung (Ü)</td>
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Learning Control / Examinations
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. The grade will be determined in a final written exam. Students can earn a bonus to the final grade by successfully participating in the exercises.

Conditions
None

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

Remarks
The lecture will be held in English.

Die folgenden Informationen stammen aus der Veranstaltung Economics and Behavior (WS 16/17):

The students
- gain insight into fundamental topics in behavioral economics;
- get to know different research methods in the field of behavioral economics;
- learn to critically evaluate experimental designs;
- get introduced to current research papers in behavioral economics;
- become acquainted with the technical terminology in English.

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.

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

Literature
Course: Economics I: Microeconomics [T-WIWI-102708]

Responsibility: Clemens Puppe, Johannes Philipp Reiß
Contained in: [M-WIWI-101398] Introduction to Economics

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<td>Johannes Philipp Reiß</td>
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Learning Control / Examinations
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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Economics I: Microeconomics (WS 16/17):

It is the main aim of this course to provide basic knowledge in economic modelling. 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.

Content
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) 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.

Workload
see German version.

Literature
- Varian, H., Grundzüge der Mikroökonomik, 5. edition (2001), Oldenburg Verlag
- Pindyck, Robert S./Rubinfeld, Daniel L., Mikroökonomie, 6. Aufl., Pearson. Münchsen, 2005

Elective literature:
- Offer for interested and top students: detailed top articles with proofs, algorithms, ... state-of-the-art surveys, industrial magazines and scientific journals, pointers to recent developments related to the course.

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
- Tutorials and perhaps simpler literature alternatives for students to fill in gaps in prerequisites (or to fresh up their memory). Alternatives with a different mode of explanation to help students understand...
**Course: Economics II: Macroeconomics [T-WIWI-102709]**

**Responsibility:** Berthold Wigger  
**Contained in:** [M-WIWI-101398] Introduction to Economics

**ECTS** 5  
**Language** deutsch  
**Version** 1

### Events

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<td>Vorlesung (V)</td>
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**Learning Control / Examinations**

The assessment consists of a written exam (120 min) according to Section 4(2), 1 of the examination regulation. The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**

None

Die folgenden Informationen stammen aus der Veranstaltung Economics II: Macroeconomics (SS 2016):

See German version.

**Content**

The lecture deals with the following topics:

Chapter 1: Macroeconomic targets  
Chapter 2: Gross domestic product: a classical model  
Chapter 3: Economic growth  
Chapter 4: Money and inflation  
Chapter 5: The open economy  
Chapter 6: IS-LM model and business cycles  
Chapter 7: Mundell-Fleming Model  
Chapter 8: Macroeconomic equilibrium  
Chapter 9: Unemployment

**Workload**

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

**Literature**

**Elective literature:**

### Course: Economics III: Introduction in Econometrics [T-WIWI-102736]

**Responsibility:** Melanie Schienle  
**Contained in:**  
- [M-WIWI-101499] Applied Microeconomics  
- [M-WIWI-101599] Statistics and Econometrics  

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<td>SS 2016</td>
<td>2520017</td>
<td>Übungen zu VWL III</td>
<td>Übung (Ü)</td>
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<td>Melanie Schienle, Rebekka Gätjen</td>
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</table>

**Learning Control / Examinations**

The assessment consists of an 1h written exam according to Section 4(2), 1 of the examination regulation.

**Conditions**

None

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Die folgenden Informationen stammen aus der Veranstaltung Economics III: Introduction in Econometrics (SS 2016):

Familiarity with the basic concepts and methods of econometrics  
Preparation of simple econometric surveys

**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
Course: Efficient Algorithms [T-WIWI-102655]

Responsibility: Hartmut Schmeck

Contained in:
- [M-WIWI-101399] Emphasis Informatics
- [M-WIWI-101426] Electives in Informatics
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

ECTS: 5  
Language: deutsch  
Version: 1

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<td>Übungen zu Effiziente Algorithmen</td>
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<td>Hartmut Schmeck, Marlon Braun</td>
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<td>SS 2016</td>
<td>2511100</td>
<td>Efficient Algorithms</td>
<td>Vorlesung (V)</td>
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<td>Hartmut Schmeck</td>
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</table>

Learning Control / Examinations
The examination will be offered latest until winter term 2016/2017 (repeaters only).
The assessment consists of assignments or of a bonus exam (wrt §4 (2), 3 SPO), and a written exam (60 min.) in the week after the end of the lecturing period (wrt §4 (2), 1 SPO).
If the mark obtained in the written exam is in between 1.3 and 4.0, a successful completion of the assignments or the bonus exam will improve the mark by one level (i.e. by 0.3 or 0.4).
Deviations from this type of assessment are announced at the beginning of this course.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Efficient Algorithms (SS 2016):
The student will learn how to use methods and concepts of efficient algorithms and how to demonstrate adequate innovative capabilities with respect to the used methods.
This course emphasizes the teaching of advanced concepts for the design and application of algorithms, data structures, and computer infrastructures in relation to their applicability in the real world. Based on a fundamental understanding of the covered concepts and methods, students should know how to select appropriate concepts and methods for problem settings in their professional life, and, if necessary, to extend and apply them in an adequate form. The students should be enabled to find adequate arguments for justifying their chosen problem solutions.

Content
In a problem oriented way the course presents systematic approaches to the design and analysis of efficient algorithms using standard tasks of information processing as generic examples. Special emphasis is put on the influence of data structures and computer architectures on the performance and cost of algorithms. In particular, the course emphasizes the design and analysis of algorithms on parallel computers and in hardware, which is increasingly important considering the growing presence of multicore architectures.

Workload
The total workload for this course is approximately 150.0 hours. For further information see German version.

Literature
Borodin, Munro: The Computational Complexity of Algebraic and Numeric Problems (Elsevier 1975)
Cormen, Leiserson, Rivest: Introduction to Algorithms (MIT Press)
Sedgewick: Algorithms (Addison-Wesley) (many different versions available)

Elective literature:
will be announced in class
## Course: eFinance: Information Engineering and Management for Securities Trading [T-WIWI-102600]

### Responsibility:
Christof Weinhardt

### Contained in:
- [M-WIWI-101434] eBusiness and Service Management
- [M-WIWI-101402] eFinance
- [M-WIWI-101465] Topics in Finance I
- [M-WIWI-101423] Topics in Finance II

### ECTS
4,5

### Language
englisch

### Version
1

### Events

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<td>2540455</td>
<td>Übungen zu eFinance: Informationswirtschaft für den Wertpapierhandel</td>
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<td>WS 16/17</td>
<td>2540454</td>
<td>eFinance: Information Engineering and Management for Securities Trading</td>
<td>Vorlesung (V)</td>
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### Learning Control / Examinations
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.

### Conditions
None

### Recommendations
None

Die folgenden Informationen stammen aus der Veranstaltung eFinance: Information Engineering and Management for Securities Trading (WS 16/17):

The students

- are able to understand the theoretical and practical aspects of securitites trading,
- are able to handle the relevant electronic tools for the evaluation of financial data,
- are able to identify the incentives of the traders for participation in different market platforms,
- are able to analyse capital marketplaces concerning their efficiency, weaknesses and technical configuration,
- are able to apply theoretical methods of econometrics,
- are able to understand, criticize and present articles with a finance-scientific background,
- learn to elaborate solutions in a team.

### 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:

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Electric Energy Systems [T-ETIT-101923]

Responsibility: Thomas Leibfried
Contained in: [M-ETIT-102379] Power Network

ECTS

Version

Conditions

none
### Course: Electrical Engineering for Business Engineers, Part I [T-ETIT-100533]

**Responsibility:** Wolfgang Menesklou  
**Contained in:** [M-ETIT-101155] Electrical Engineering

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Course: Electrical Engineering for Business Engineers, Part II [T-ETIT-100534]

Responsibility: Wolfgang Menesklou

Contained in: [M-MACH-101261] Emphasis in Fundamentals of Engineering

ECTS 5
SWS 3
Version 1
Course: Elements and Systems of Technical Logistics [T-MACH-102159]

Responsibility: Vladimir Madzharov, Martin Mittwollen

Contained in: [M-MACH-101269] Introduction to Technical Logistics

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Conditions
none

Modeled Conditions
The following conditions must be met:
- Successful completion of course [T-MACH-102163] Basics of Technical Logistics is required before taking this course.

Die folgenden Informationen stammen aus der Veranstaltung Elements and systems of Technical Logistics (WS 16/17):

Students are able to:
- Describe elements and systems of technical logistics,
- Model and calculate structures and functions of special conveying machines,
- Describe interdependence of material flow systems and technique quantitatively and qualitatively and
- Equip material flow systems with appropriate machines.

Content
material flow systems and their (conveying) technical components
mechanical behaviour of conveyors;
structure and function of conveyor machines; elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)
sample applications and calculations in addition to the lectures inside practical lectures

Workload
presence: 31.5h
rework: 148.5h

Literature
recommendations during lectures
Course: Elements of Technical Logistics and Project [T-MACH-102178]

Responsibility: Vladimir Madzharov, Martin Mittwollen

Contained in: [M-MACH-101269] Introduction to Technical Logistics

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Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Elements and systems of Technical Logistics plus project (WS 16/17):

Students are able to:

- Describe elements and systems of technical logistics,
- Model and calculate structures and functions of special conveying machines,
- Describe interdependence of material flow systems and technique quantitatively and qualitatively,
- Equip material flow systems with appropriate machines and
- Judge about systems in place and justify it in front of subject related persons.

Content

mechanical behaviour of conveyors;
structure and function of conveyor machines; elements of intralogistics (belt conveyor, racks, automatic guided vehicles, fan-in, bifurcation, and etc.)
sample applications and calculations in addition to the lectures inside practical lectures
Self manufacturing of a project report to recesses the topic.

Workload

presence: 42h
rework: 198h

Literature

recommendations during lectures
The students can name all important influences on the combustion process. They can analyse and evaluate the engine process considering efficiency, emissions and potential.

**Content**
1. Introduction
2. Thermodynamics of combustion engines
3. Fundamentals
4. gas exchange
5. Flow field
6. Wall heat losses
7. Combustion in gasoline engines
8. APR und DVA
9. Combustion in Diesel engines
10. Emissions
11. Waste heat recovery
12. Measures to increase efficiency

**Workload**
regular attendance: 24 hours, self-study: 96 hours
Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

Responsibility: Meike Braun, Frank Schönung
Contained in: [M-MACH-101269] Introduction to Technical Logistics

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<td>2117500</td>
<td>Energy efficient intralogistic systems</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Meike Braun, Frank Schönung</td>
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</table>

Conditions
none

Die folgenden Informationen stammen aus der Veranstaltung Energy efficient intralogistic systems (WS 16/17):

Students are able to:
- Describe and choose basic measures to enhance energy efficiency,
- Specify these measures considering material handling processes like
  - steady conveyors,
  - unsteady conveyors,
  - as well as the necessary drives,
- Model based on these material handling systems and calculate their energy efficiency and
- Choose resource efficient material handling systems.

Content
The main focuses of the course are:
- green supply chain
- processes in Intralogistic systems
- evaluation of energy consumption of conveyors
- modeling of conveying systems
- methods for energy savings
- approaches for energy efficiency increasing of continuous and discontinuous conveyors
- dimensioning energy efficient drives
- new approaches for resource efficient conveying systems.

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
None.
Course: Energy Policy [T-WIWI-102607]

Responsibility: Martin Wietschel

Contained in: [M-WIWI-101464] Energy Economics

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<td>Energy Policy</td>
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<td>Martin Wietschel</td>
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Learning Control / Examinations
The assessment consists of a written exam 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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Energy Policy (SS 2016):
See German version.

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.
### Course: Engine Measurement Techniques [T-MACH-105169]

**Responsibility:** Sören Bernhardt  
**Contained in:** [M-MACH-101303] Combustion Engines II

![ECTS](image) ![Language](image) ![Version](image)

#### Events

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<td>Engine measurement techniques</td>
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#### Modeled Conditions

The following conditions must be met:
- Successful completion of course [T-MACH-102194] Combustion Engines I is required before taking this course.

_Die folgenden Informationen stammen aus der Veranstaltung Engine measurement techniques (SS 2016):_

The students are able to explain the principles of modern measuring devices and are able to determine the right device for a certain measuring problem. They are able to analyse and evaluate the results.

**Content**

Students get to know state-of-the-art measurement techniques for combustion engines. In particular basic techniques for measuring engine operating parameters such as torque, speed, power and temperature.

Possible measurement errors and aberrations are discussed.

Furthermore techniques for measuring exhaust emissions, air/fuel ratio, fuel consumption as well as pressure indication for thermodynamic analysis are covered.

**Workload**

- regular attendance: 21 hours  
- self-study: 100 hours

**Literature**

Lecture notes available in the lectures or in the ‘Studentenhaus’

1. Grohe, H.: Messen an Verbrennungsmotoren  
2. Bosch: Handbuch Kraftfahrzeugtechnik  
3. Veröffentlichungen von Firmen aus der Meßtechnik  
4. Hoffmann, Handbuch der Meßtechnik  
5. Klingenberg, Automobil-Meßtechnik, Band C
Course: Enterprise Architecture Management [T-WIWI-102668]

Responsibility: Thomas Wolf

Contained in:
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

ECTS: 5  Language: deutsch  Version: 1

Events

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<td>Enterprise Architecture Management</td>
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<td>WS 16/17</td>
<td>2511601</td>
<td>Übungen zu Enterprise Architecture Management</td>
<td>Übung (Ü)</td>
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</table>

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Enterprise Architecture Management (WS 16/17):

Students understand the connection between enterprise strategy, business processes and business objects and IT architecture; they know methods to depict these connections and how they can be developed based on each other.

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
Course: Enterprise Risk Management [T-WIWI-102608]

Responsibility: Ute Werner

Contained in: [M-WIWI-101436] Risk and Insurance Management

**ECTS**

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<td>Enterprise Risk Management</td>
<td>Vorlesung (V)</td>
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<td>Ute Werner</td>
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**Learning Control / Examinations**

The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation).

The overall grade consists of the assessment of the oral presentations incl. term papers (50 percent) and the assessment of the oral exam (50 percent).

**Conditions**

None

**Recommendations**

None

Die folgenden Informationen stammen aus der Veranstaltung Enterprise Risk Management (WS 16/17):

Learning to identify, to analyse and to assess business risks; this serves as a basis for strategy and policy design regarding risks and opportunities of an enterprise. Introduction to approaches that allow to consider area-specific risk objectives, risk-bearing capacity and risk acceptance.

**Content**

1. Concepts and practice of risk management, based on decision theory
2. Goals, strategies and policies for the identification, analysis, assessment and management of risks
3. Insurance as an instrument for loss-financing
4. Selected aspects of risk management: e.g. environmental protection, organizational failure and D&O-coverage, development of a risk management culture
5. Organisation of risk management
6. Approaches for determining optimal combinations of risk management measures considering their investment costs and outcomes.

**Workload**

The overall amount of work necessary for this course is approx. 135 hours (4.5 ECTS-Credits).

**Literature**


**Elective literature:**

Additional literature is recommended during the course.
Course: Exam on Climatology [T-PHYS-105594]

Responsibility:

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS
6

Version
1

Modeled Conditions
The following conditions must be met:

- Successful completion of course [T-PHYS-101092] Climatology is required before taking this course.
Course: Exam on Meteorological Hazards [T-PHYS-105954]

Responsibility: Michael Kunz

Contained in: [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
[M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS: 3  Version: 1

Modeled Conditions
The following conditions must be met:

- Successful completion of course [T-PHYS-101557] Meteorological Hazards is required before taking this course.
Course: Exchanges [T-WIWI-102625]

Responsibility: Jörg Franke

Contained in:
- [M-WIWI-101402] eFinance
- [M-WIWI-101465] Topics in Finance I
- [M-WIWI-101423] Topics in Finance II

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<td>Jörg Franke</td>
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</table>

Learning Control / Examinations
See German version.

Conditions
None

Recommendations
None

Die folgenden Informationen stammen aus der Veranstaltung Exchanges (SS 2016):
Students are in a position to discuss and evaluate current developments regarding the organisation of exchanges and securities trading.

Content
- Organisation of exchanges: Changing Zeitgeist - Corporates instead of cooperatorative structures
- Market models: order driven vs. market maker - Liquidity provision for less frequently traded securities
- Trading systems: The end of an era? - No more need for running traders?
- Clearing: Diversity instead of uniformity - Safety for all?
- Settlement: Increasing importance - Does efficient settlement assure the "value added" of exchanges in the long run?

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
Elective literature:
Educational material will be offered within the lecture.
**Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]**

**Responsibility:** Stefan Nickel  
**Contained in:**  
- [M-WIWI-101421] Supply Chain Management  
- [M-WIWI-101414] Methodical Foundations of OR

### ECTS 4.5  
**Language** deutsch  
**Version** 1

#### Events

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<td>Übungen zu Standortplanung und strategisches SCM</td>
<td>Übung (U)</td>
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<td>Brita Rohrbeck</td>
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<td>WS 16/17</td>
<td>2550486</td>
<td>Facility Location and Strategic Supply Chain Management</td>
<td>Vorlesung (V)</td>
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<td>Stefan Nickel</td>
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</table>

**Learning Control / Examinations**  
The assessment consists of a written exam (120 min) according to Section 4 (2), 1 of the examination regulation.  
The exam takes place in every semester.  
Prerequisite for admission to examination is the successful completion of the online assessments.

**Conditions**  
Prerequisite for admission to examination is the successful completion of the online assessments.

**Modeled Conditions**  
The following conditions must be met:  
- Successful completion of course [T-WIWI-103061] Prerequisite for Facility Location and Strategic Supply Chain Management is required before taking this course.

**Recommendations**  
None

**Remarks**  
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

**Content**  
Since the classical work “Theory of the Location of Industries” of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.  
Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models designed for Supply Chain Management (single-period and multi-period models) and advanced location planning models designed for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

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

**Literature**

**Elective literature:**
• Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
• Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
• Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005
Die folgenden Informationen stammen aus der Veranstaltung Failure of structural materials: deformation and fracture (WS 16/17):

The student

- has the basic understanding of mechanical processes to explain the relationship between externally applied load and materials strength.
- can explain the foundation of linear elastic fracture mechanics and is able to determine if this concept can be applied to a failure by fracture.
- can describe the main empirical materials models for deformation and fracture and can apply them.
- has the physical understanding to describe and explain phenomena of failure.

Content

1. Introduction
2. linear elasticity
3. classification of stresses
4. Failure due to plasticity
   - tensile test
   - dislocations
   - hardening mechanisms
   - guidelines for dimensioning
5. composite materials
6. fracture mechanics
   - hypotheses for failure
   - linear elastic fracture mechanics
   - crack resistance
   - experimental measurement of fracture toughness
   - defect measurement
   - crack propagation
   - application of fracture mechanics
   - atomistics of fracture

Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature

- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relatively simple but yet comprehensive overview of metallic materials
Die folgenden Informationen stammen aus der Veranstaltung Failure of Structural Materials: Fatigue and Creep (WS 16/17):

The student

- has the basic understanding of mechanical processes to explain the relationships between externally applied load and materials strength.
- can describe the main empirical materials models for fatigue and creep and can apply them.
- has the physical understanding to describe and explain phenomena of failure.
- can use statistical approaches for reliability predictions.
- can use its acquired skills, to select and develop materials for specific applications.

Content

1 Fatigue
1.1 Introduction
1.2 Statistical Aspects
1.3 Lifetime
1.4 Fatigue Mechanisms
1.5 Material Selection
1.6 Thermomechanical Loading
1.7 Notches and Shape Optimization
1.8 Case Study: ICE-Desaster

2 Creep
2.1 Introduction
2.2 High Temperature Plasticity
2.3 Phänomenological Description of Creep
2.4 Creep Mechanisms
2.5 Alloying Effects

Workload

regular attendance: 22,5 hours
self-study: 97,5 hours

Literature

- Bruchvorgänge in metallischen Werkstoffen, D. Aurich (Werkstofftechnische Verlagsgesellschaft Karlsruhe), relatively simple but yet comprehensive overview of metallic materials
- Fatigue of Materials, Subra Suresh (2nd Edition, Cambridge University Press); standard work on fatigue, all classes of materials, extensive, for beginners and advanced student
Course: Financial Accounting and Cost Accounting [T-WIWI-102816]

Responsibility: Jan-Oliver Strych

Contained in: [M-WIWI-101578] Fundamentals of Business Administration 2

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<td>Übung zu Rechnungswesen</td>
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<td>Jan-Oliver Strych</td>
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Learning Control / Examinations
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.

Conditions
None
Course: Financial Econometrics [T-WIWI-103064]

Responsibility: Melanie Schienle

Contained in: [M-WIWI-101599] Statistics and Econometrics

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<td>SS 2016</td>
<td>2520023</td>
<td>Übungen zu Financial Econometrics I</td>
<td>Übung (Ü)</td>
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<td>Melanie Schienle, Chong Liang</td>
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Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

Recommendations
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Remarks
The course is offered in summer term 2016, in winter term 2017/18 and afterwards every second term.
Course: Financial Intermediation [T-WIWI-102623]

Responsibility: Martin Ruckes

Contained in:
- [M-WIWI-101465] Topics in Finance I
- [M-WIWI-101423] Topics in Finance II

ECTS: 4,5
Language: deutsch
Version: 1

Events

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<td>Financial Intermediation</td>
<td>Vorlesung (V)</td>
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Learning Control / Examinations

The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins. The exam is offered each semester.

Conditions

None

Recommendations

None

Die folgenden Informationen stammen aus der Veranstaltung Financial Intermediation (WS 16/17):

Students

- are in a position to describe the arguments for the existence of financial intermediaries,
- are able of discuss and analyze both static and dynamic aspects of contractual relationships between banks and borrowers,
- are able to discuss the macroeconomic role of the banking system,
- are in a position to explain the fundamental principles of the prudential regulation of banks and are able to recognize and evaluate the implications of specific regulations.

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:

Course: Financial Management [T-WIWI-102605]

Responsibility: Martin Ruckes

Contained in: [M-WIWI-101435] Essentials of Finance

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Learning Control / Examinations

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.

Conditions

None

Recommendations

Knowledge of the content of the course Business Administration: Finance and Accounting [25026/25027] is recommended.

Die folgenden Informationen stammen aus der Veranstaltung Financial Management (SS 2016):

Students

- are able to characterize the central questions of financial management,
- are in a position to explain the role of liquidity, compute important liquidity ratios and explain their meaning,
- are able to describe and discuss the basic principles of working capital management,
- know different types of corporate financing as well as their pros and cons,
- are in a position to analyze firms’ capital structures and to identify possible improvements,
- are familiar with basic questions of corporate distribution policy.

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:

- Berk, De Marzo (2014): Corporate Finance, Pearson Addison Wesley
**Course: Fluid Power Systems [T-MACH-102093]**

**Responsibility:** Stefan Haug, Martin Scherer, Marcus Geimer

**Contained in:**
- [M-MACH-101266] Automotive Engineering
- [M-MACH-101267] Mobile Machines

**ECTS:** 5  
**Language:** deutsch  
**Version:** 1

### Events

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<td>WS 16/17</td>
<td>2114093</td>
<td>Fluid Technology</td>
<td>Vorlesung (V)</td>
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</table>

**Die folgenden Informationen stammen aus der Veranstaltung Fluid Technology (WS 16/17):**

The students will be able to

- know and understand physical principles of fluid power systems
- know the current components and their operating mode
- know the advantages and disadvantages of different components
- dimension the components for a given purpose
- calculate simple systems

**Content**

In the range of hydrostatics the following topics will be introduced:

- Hydraulic fluids
- Pumps and motors
- Valves
- Accessories
- Hydraulic circuits.

In the range of pneumatics the following topics will be introduced:

- Compressors
- Motors
- Valves
- Pneumatic circuits.

**Workload**

- regular attendance: 21 hours
- self-study: 92 hours

**Literature**

Scritum for the lecture *Fluidtechnik*
Institute of Vehicle System Technology
downloadable

Responsibility: Christof Weinhardt, Gerhard Satzger

Contained in:
- [M-WIWI-101434] eBusiness and Service Management
- [M-WIWI-101422] Specialization in Customer Relationship Management

ECTS: 4.5

Language: englisch

Version: 2

Events

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<th>Term</th>
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<tr>
<td>SS 2016</td>
<td>2595466</td>
<td>Foundations of Digital Services A</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Christof Weinhardt, Niklas Kühl, York Sure-Vetter, Gerhard Satzger</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
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). The bonus only applies to the first and second exam of the semester in which it was obtained.

Conditions
None

Remarks

Die folgenden Informationen stammen aus der Veranstaltung Foundations of Digital Services A (SS 2016):

This course conveys the fundamental knowledge to understand the importance of services in our economy and the impact of information and communication technology (ICT) on existing and emerging service industries. Combining theoretical models with multiple case studies and application scenarios, this course will enable students:

- to understand different service perspectives and apply the general concept of “value co-creation”
- to know and to be able to apply concepts, methods and tools used for the design, engineering and management of eServices
- to be familiar with current research topics
- to gain experience in group work and to improve their presentation skills
- to be exposed to English language in preparation for working in international environments

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.
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.
<table>
<thead>
<tr>
<th>Course: Foundations of Digital Services B [T-WIWI-105775]</th>
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<tbody>
<tr>
<td><strong>Responsibility:</strong> Stefan Nickel, Stefan Morana, Alexander Mädche</td>
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<tr>
<td><strong>Contained in:</strong> [M-WIWI-102752] Fundamentals of Digital Service Systems</td>
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<td><strong>Remarks</strong></td>
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<td>The course will start from winter term 2016/17.</td>
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</table>
**Course: Foundations of Informatics I [T-WIWI-102749]**

**Responsibility:** York Sure-Vetter  
**Contained in:** [M-WIWI-101417] Foundations of Informatics

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### Events

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<tr>
<td>SS 2016</td>
<td>2511010</td>
<td>Foundations of Informatics I</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Achim Rettinger, York Sure-Vetter</td>
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<tr>
<td>SS 2016</td>
<td>2511011</td>
<td>Exercises to Foundations of Informatics I</td>
<td>Übung (Ü)</td>
<td></td>
<td>Patrick Philipp, Tobias Weller, Achim Rettinger, York Sure-Vetter</td>
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</tbody>
</table>

**Learning Control / Examinations**

The assessment consists of an 1h written exam according to Section 4 (2), 1 of the examination regulation. The exam takes place every semester. Re-examinations are offered at every ordinary examination date.

**Conditions**

None

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*Die folgenden Informationen stammen aus der Veranstaltung Foundations of Informatics I (SS 2016):*

The student

- is able to formalise tasks in the domain of informatics and is able to identify solution methods
- knows the basic terminology of computer science and is capable of applying these terms to different problems.
- knows basic programming structures and is able to apply them (particularly simple data structures, object interaction and implementation of basic algorithms).

**Content**

The following topics are covered:

- Object Oriented Modeling
- Logic (Propositional Calculus, Predicate Logic, Boolean Algebra)
- Algorithms and Their Properties
- Sort-and Search-Algorithms
- Complexity Theory
- Problem Specification
- Dynamic Data Structures

**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 will be announced in the lecture.
Course: Foundations of Informatics II [T-WIWI-102707]

Responsibility: Hartmut Schmeck

Contained in: [M-WIWI-101417] Foundations of Informatics

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<td>WS 16/17</td>
<td>2511012</td>
<td>Foundations of Informatics II</td>
<td>Vorlesung (V)</td>
<td>3</td>
<td>Hartmut Schmeck</td>
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<td>WS 16/17</td>
<td>2511014</td>
<td>Tutorien zu Grundlagen der Informatik II</td>
<td>Tutorium (Tu)</td>
<td></td>
<td>Micaela Wünsche, Hartmut Schmeck, Friederike Pfeiffer-Bohnen, Marlon Braun, Lukas König</td>
</tr>
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</table>

Learning Control / Examinations

The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation. If the grade obtained in the written exam is in between 1.3 and 4.0, a successful bonus exam will improve the grade by one level. The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions

None

Recommendations

It is recommended to attend the course Foundations of Informatics I [2511010] beforehand. Active participation in the practical lessons is strongly recommended.

Die folgenden Informationen stammen aus der Veranstaltung Foundations of Informatics II (WS 16/17):

See German version.

Content

Die Vorlesung beschäftigt sich mit formalen Modellen für Automaten, Sprachen und Algorithmen sowie mit realen Ausprägungen dieser Modelle, d.h. mit Rechnerarchitektur und -organisation (Hardware-Entwurf, Rechnerarithmetik, Architektur-Konzepte), Programmiersprachen (verschiedene Sprachebenen von Mikroprogrammierung bis zu höheren Programmiersprachen, sowie Programmübersetzung und -ausführung), Betriebssystemen und Betriebarten (Aufbau und Eigenschaften von Betriebssystemen, konkrete Betriebssystem-Aufgaben, Client-Server Systeme), Dateiorganisation und Datenverwaltung (Dateiorganisationen, Primär-/Sekundärorganisation).

Workload

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

Literature

Elective literature:

Will be announced in the lecture.
Course: Foundations of mobile Business [T-WIWI-104679]

Responsibility: Andreas Oberweis, Gunther Schiefer

Contained in: [M-WIWI-101399] Emphasis Informatics
[M-WIWI-101426] Electives in Informatic

ECTS 5 Language deutsch Version 1

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<tr>
<td>SS 2016</td>
<td>2511227</td>
<td>Übungen zu Grundlagen für mobile Business</td>
<td>Übung (U)</td>
<td>1</td>
<td>Gunther Schiefer</td>
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<tr>
<td>SS 2016</td>
<td>2511226</td>
<td>Grundlagen für mobile Business</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Gunther Schiefer</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Grundlagen für mobile Business (SS 2016):
Wenn Sie im Beruf mit einer Fragestellung konfrontiert werden, welche „Mobile Business“ tangiert, sollen Sie in der Lage sein, schnell und kompetent entsprechende Antworten zu geben.
Dazu ist ein breiter Überblick über das Themenfeld nötig:
- Marktstrukturen
- Technik
- Möglichkeiten für Anwendungen
- Prozesse
- Probleme

Content
Die Vorlesung behandelt die Grundlagen für Mobile Business mit Schwerpunkt auf den (informations-)technischen Grundlagen. Diese werden mit dem wirtschaftlichen Hintergrund in Deutschland verzahnt.
Geplänter Inhalt:
1. Organisatorisches
2. Einführung & Definitionen
3. Mobile Geräte
4. Mobilfunkmarkt
5. Mobilfunktechnologien
6. Digitale Funktechnologien
7. Mobile Anwendungen
8. Ortung & Kontext
9. Problemfelder
Anmerkung: Die oben angegebenen Lehreinheiten haben jeweils einen unterschiedlichen Umfang.

Workload
Der Gesamtarbeitsaufwand für diese Lerneinheit beträgt ca. 150 Stunden (5.0 Credits).
Vorlesung 24h
Übungsseinheiten 12h
Vor- bzw. Nachbereitung der Vorlesung 36h
Vor- bzw. Nachbereitung der Übungen 24h
Prüfungsvorbereitung 53h
Prüfung 1h
Summe: 150h

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Responsibility: Bernhard Kehrwald

Contained in: [M-MACH-101303] Combustion Engines II

ECTS 4  Language deutsch  Version 1

Events

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<tr>
<td>WS 16/17</td>
<td>2133108</td>
<td>Fuels and Lubricants for Combustion Engines</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Bernhard Kehrwald</td>
</tr>
</tbody>
</table>

Conditions
none

Die folgenden Informationen stammen aus der Veranstaltung Fuels and Lubricants for Combustion Engines (WS 16/17):

The students can name and explain composition and meaning of fuels, lubricants and coolants as important components in the system of todays Otto and Diesel engines as well as definition and chemical composition of fuels and lubricants, the meaning of crude oil as basic primary product, production processes, major properties, standards and specifications, testing methods.

They can point out future worldwide trends in the field of conventional and alternative fuels regarding emission standards and energy conservation

Content
Introduction and basics

Fuels for Gasoline and Diesel engines

Hydrogen

Lubricants for Gasoline and Diesel engines

Coolants for combustion engines

Workload
regular attendance: 24 hours
self-study: 96 hours

Literature
Lecturer notes
Course: Fundamentals for Design of Motor-Vehicle Bodies I [T-MACH-102116]

Responsibility: Horst Dietmar Bardehle

Contained in: [M-MACH-101266] Automotive Engineering

ECTS 1,5 Language deutsch Version 1

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<tr>
<td>WS 16/17</td>
<td>2113814</td>
<td>Fundamentals for Design of Motor-Vehicles Bodies I</td>
<td>Vorlesung (V)</td>
<td>1</td>
<td>Horst Dietmar Bardehle</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Fundamentals for Design of Motor-Vehicles Bodies I (WS 16/17): The students have an overview of the fundamental possibilities for design and manufacture of motor-vehicle bodies. They know the complete process, from the first idea, through the concept to the dimensioned drawings (e.g. with FE-methods). They have knowledge about the fundamentals and their correlations, to be able to analyze and to judge relating components as well as to develop them accordingly.

Content
1. History and design
2. Aerodynamics
3. Design methods (CAD/CAM, FEM)
4. Manufacturing methods of body parts
5. Fastening technologie
6. Body in white / body production, body surface

Workload
regular attendance: 10,5 hours
self-study: 49,5 hours

Literature
1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg
The students know that, often the design of seemingly simple detail components can result in the solution of complex problems. They have knowledge in testing procedures of body properties. They have an overview of body parts such as bumpers, window lift mechanism and seats. They understand, as well as, parallel to the normal electrical system, about the electronic side of a motor vehicle. Based on this they are ready to analyze and to judge the relation of these single components. They are also able to contribute competently to complex development tasks by imparted knowledge in project management.

**Content**

1. Body properties/testing procedures

2. External body-parts

3. Interior trim

4. Compartment air conditioning

5. Electric and electronic features

6. Crash tests

7. Project management aspects, future prospects

**Workload**

regular attendance: 10,5 hours
self-study: 49,5 hours

**Literature**

1. Automobiltechnische Zeitschrift ATZ, Friedr. Vieweg & Sohn Verlagsges. mbH, Wiesbaden
2. Automobil Revue, Bern (Schweiz)
3. Automobil Produktion, Verlag Moderne Industrie, Landsberg
Course: Fundamentals in the Development of Commercial Vehicles I [T-MACH-105160]

Responsibility: Jörg Zürn

Contained in: [M-MACH-101267] Mobile Machines
[M-MACH-101265] Vehicle Development

ECTS 1.5
Language deutsch
Version 1

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<td>WS 16/17</td>
<td>2113812</td>
<td>Fundamentals in the Development of Commercial Vehicles I</td>
<td>Vorlesung (V)</td>
<td>1</td>
<td>Jörg Zürn</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Fundamentals in the Development of Commercial Vehicles I (WS 16/17):

The students have proper knowledge about the process of commercial vehicle development starting from the concept and the underlying original idea to the real design. They know that the customer requirements, the technical realisability, the functionality and the economy are important drivers.

The students are able to develop parts and components. Furthermore they have knowledge about different cab concepts, the interior and the interior design process. Consequently they are ready to analyze and to judge concepts of commercial vehicles as well as to participate competently in the commercial vehicle development.

Content
1. Introduction, definitions, history
2. Development tools
3. Complete vehicle
4. Cab, bodyshell work
5. Cab, interior fitting
6. Alternative drive systems
7. Drive train
8. Drive system diesel engine
9. Intercooled diesel engines

Workload
regular attendance: 10,5 hours
self-study: 49,5 hours

Literature


Course: Fundamentals in the Development of Commercial Vehicles II [T-MACH-105161]

Responsibility: Jörg Zürn

Contained in: [M-MACH-101267] Mobile Machines
[M-MACH-101265] Vehicle Development

ECTS Language Version
1,5 deutsch 1

Events

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<td>SS 2016</td>
<td>2114844</td>
<td>Fundamentals in the Development of Commercial Vehicles II</td>
<td>Vorlesung (V)</td>
<td>1</td>
<td>Jörg Zürn</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Fundamentals in the Development of Commercial Vehicles II (SS 2016):

The students know the advantages and disadvantages of different drives. Furthermore they are familiar with components, such as transfer box, propeller shaft, powered and non-powered front axle etc. Beside other mechanical components, such as chassis, axle suspension and braking system, also electric and electronic systems are known. Consequently the student are able to analyze and to judge the general concepts as well as to adjust them precisely with the area of application.

Content
1. Gear boxes of commercial vehicles
2. Intermediate elements of the drive train
3. Axle systems
4. Front axles and driving dynamics
5. Chassis and axle suspension
6. Braking System
7. Systems
8. Excursion

Workload
regular attendance: 10,5 hours
self-study: 49,5 hours

Literature


Course: Fundamentals of Automobile Development I [T-MACH-105162]

Responsibility: Rolf Frech

Contained in: [M-MACH-101265] Vehicle Development

ECTS 1.5  Language deutsch  Version 1

Events

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<td>WS 16/17</td>
<td>2113810</td>
<td>Fundamentals of Automobile Development I</td>
<td>Vorlesung (V)</td>
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<td>Rolf Frech</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Fundamentals of Automobile Development I (WS 16/17):

The students have an overview of the fundamentals of the development of automobiles. They know the development process, the national and the international legal requirements that are to be met. They have knowledge about the thermo-management, aerodynamics and the design of an automobile. They are ready to judge goal conflicts in the field of automobile development and to work out approaches to solving a problem.

Content
1. Process of automobile development
2. Conceptual dimensioning and design of an automobile
3. Laws and regulations – National and international boundary conditions
4. Aero dynamical dimensioning and design of an automobile I
5. Aero dynamical dimensioning and design of an automobile II
6. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines I
7. Thermo-management in the conflict of objectives between styling, aerodynamic and packaging guidelines II

Workload
regular attendance: 10.5 hours
self-study: 49.5 hours

Literature
The scriptum will be provided during the first lessons
Course: Fundamentals of Automobile Development II [T-MACH-105163]

Responsibility: Rolf Frech
Contained in: [M-MACH-101265] Vehicle Development

ECTS: 1.5
Language: deutsch
Version: 1

Events

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<td>SS 2016</td>
<td>2114842</td>
<td>Fundamentals of Automobile Development II</td>
<td>Vorlesung (V)</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Fundamentals of Automobile Development II (SS 2016):

The students are familiar with the selection of appropriate materials and the choice of adequate production technology. They have knowledge of the acoustical properties of the automobiles, covering both the interior sound and exterior noise. They have an overview of the testing procedures of the automobiles. They know in detail the evaluation of the properties of the complete automobile. They are ready to participate competently in the development process of the complete vehicle.

Content
1. Application-oriented material and production technology I
2. Application-oriented material and production technology II
3. Overall vehicle acoustics in the automobile development
4. Drive train acoustics in the automobile development
5. Testing of the complete vehicle
6. Properties of the complete automobile

Workload
regular attendance: 10.5 hours
self-study: 49.5 hours

Literature
The scriptum will be provided during the first lessons.
Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsibility: Egbert Lox

Contained in: [M-MACH-101303] Combustion Engines II

ECTS 4 Language deutsch Version 1

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<tr>
<td>SS 2016</td>
<td>2134138</td>
<td>Fundamentals of catalytic exhaust gas aftertreatment</td>
<td>Vorlesung (V) 2</td>
<td></td>
<td>Olaf Deutschmann, Jan-Dierk Grunwaldt, Egbert Lox</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Fundamentals of catalytic exhaust gas aftertreatment (SS 2016):

The students can name and explain the scientific fundamentals of the catalytic exhaust gas aftertreatment, as well as the technical, political and economical parameters of its application in engines for passenger cars and HD vehicles.

The students are able to point out and explain which emissions are formed in combustion engines, why these emissions are health-related critical and which measures the legislator has established to reduce the emissions.

Content
1. kind and source of emissions
2. emission legislation
3. principal of catalytic exhaust gas aftertreatment (EGA)
4. EGA at stoichiometric gasoline engines
5. EGA at gasoline engines with lean mixtures
6. EGA at diesel engines
7. economical basic conditions for catalytic EGA

Workload
regular attendance: 36 hours
self-study: 84 hours

Literature
Lecture notes available in the lectures


Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Fundamentals of Production Management [T-WIWI-102606]

Responsibility: Frank Schultmann
Contained in: [M-WIWI-101437] Industrial Production I

ECTS: 5.5
Language: deutsch
Version: 1

Events

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<tr>
<td>SS 2016</td>
<td>2581951</td>
<td>Übungen Grundlagen der Produktionswirtschaft</td>
<td>Übung (Ü)</td>
<td>2</td>
<td>Felix Hübner, Elias Naber</td>
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<tr>
<td>SS 2016</td>
<td>2581950</td>
<td>Fundamentals of Production Management</td>
<td>Vorlesung (V)</td>
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<td>Frank Schultmann</td>
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Learning Control / Examinations
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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Fundamentals of Production Management (SS 2016):

- Students should describe the tasks of strategic corporate planning.
- Students should be able to use general approaches in order to solve these problems.

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
Course: Gas Engines [T-MACH-102197]

Responsibility: Rainer Golloch

Contained in: [M-MACH-101303] Combustion Engines II

ECTS 4  Version 1
Course: Gear Cutting Technology [T-MACH-102148]

Responsibility: Markus Klaiber
Contained in: [M-MACH-101284] Specialization in Production Engineering

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<tr>
<td>WS 16/17</td>
<td>2149655</td>
<td>Gear Cutting Technology</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Markus Klaiber</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Gear Cutting Technology (WS 16/17):

The students...

- can describe the basic terms of gearings and are able to explain the imparted basics of the gearwheel and gearing theory.
- are able to specify the different manufacturing processes and machine technologies for producing gearings. Furthermore they are able to explain the functional principles and the dis-/advantages of these manufacturing processes.
- can apply the basics of the gearing theory and manufacturing processes on new problems.
- are able to read and interpret measuring records for gearings.
- are able to make an appropriate selection of a process based on a given application
- can describe the entire process chain for the production of toothed components and their respective influence on the resulting workpiece properties.

Content

Based on the gearing theory, manufacturing processes and machine technologies for producing gearings, the needs of modern gear manufacturing will be discussed in the lecture. For this purpose, various processes for various gear types are taught which represent the state of the art in practice today. A classification in soft and hard machining and furthermore in cutting and non-cutting technologies will be made. For comprehensive understanding the processes, machine technologies, tools and applications of the manufacturing of gearings will be introduced and the current developments presented. For assessment and classification of the applications and the performance of the technologies, the methods of mass production and manufacturing defects will be discussed. Sample parts, reports from current developments in the field of research and an excursion to a gear manufacturing company round out the lecture.

The following topics will be covered:

- Sample applications
- Basics of gearing geometry
- Need of gearboxes
- Soft machining processes
- Hardening processes
- Hard machining processes
- Bevel gear production
- Measurement and testing
- Manufacturing of gearbox components
- Special gearings

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

Lecture Slides
Course: Geological Hazards and Risks for external students [T-PHYS-103117]

Responsibility:

Contained in:  
[M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1  
[M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS: 4  
Version: 1
Course: Global Optimization I [T-WIWI-102726]

Responsibility: Oliver Stein

[M-WIWI-101414] Methodical Foundations of OR

ECTS 4,5

Version 1

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<tr>
<td>SS 2016</td>
<td>2550144</td>
<td>Rechnerübung zu Globale Optimierung I+II</td>
<td>Übung (Ü)</td>
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<td>Oliver Stein, Marcel Sinske</td>
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<tr>
<td>SS 2016</td>
<td>2550135</td>
<td>Übungen zu Globale Optimierung I+II</td>
<td>Übung (Ü)</td>
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<td>Tomás Bajbar, Oliver Stein</td>
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</tbody>
</table>

Learning Control / Examinations

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester. Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite. The examination can also be combined with the examination of Global Optimization II [2550136]. In this case, the duration of the written examination takes 120 minutes.

Conditions
None

Modeled Conditions
The following conditions must be met:

- Course [T-WIWI-103638] Global Optimization I and II and this course are mutually exclusive.

Recommendations
None

Remarks
Part I and II of the lecture are held consecutively in the same semester.
Learning Control / Examinations
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester. Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

Conditions
None

Modeled Conditions
The following conditions must be met:

1. Course [T-WIWI-102726] Global Optimization I and this course are mutually exclusive.
2. Course [T-WIWI-102727] Global Optimization II and this course are mutually exclusive.

Recommendations
None

Remarks
Part I and II of the lecture are held consecutively in the same semester.
# Course: Global Optimization II [T-WIWI-102727]

**Responsibility:** Oliver Stein  
**Contained in:** [M-WIWI-101414] Methodical Foundations of OR

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## Events

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<tr>
<td>SS 2016</td>
<td>2550144</td>
<td>Rechnerübung zu Globale Optimierung I+II</td>
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<td></td>
<td>Oliver Stein, Marcel Sinske</td>
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<tr>
<td>SS 2016</td>
<td>2550135</td>
<td>Übungen zu Globale Optimierung I+II</td>
<td>Übung (Ü)</td>
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<td>Tomás Bajbar, Oliver Stein</td>
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</table>

## Learning Control / Examinations

The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester. Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration to the written examinations is subject to fulfilling the prerequisite. The examination can also be combined with the examination of *Global Optimization I* [2550134]. In this case, the duration of the written examination takes 120 minutes.

### Conditions

None

### Modeled Conditions

The following conditions must be met:

- Course [T-WIWI-103638] *Global Optimization I and II* and this course are mutually exclusive.

### Remarks

Part I and II of the lecture are held consecutively in the same semester.
Course: Global Vehicle Evaluation within Virtual Road Test [T-MACH-102177]

Responsibility: Bernhard Schick

Contained in: [M-MACH-101264] Handling Characteristics of Motor Vehicles

ECTS 3 Language deutsch Version 1

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<tr>
<td>SS 2016</td>
<td>2114850</td>
<td>Global vehicle evaluation within virtual road test</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Bernhard Schick</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Global vehicle evaluation within virtual road test (SS 2016):

The students have an overview of the vehicle dynamics simulation, the model parametrization and the related data sources. They have good knowledge about vehicle dynamics test methods and related execution of virtual test driving (open loop, closed loop). They are able to evaluate driving behavior based on self-created results. They have achieved knowledge about influences and interactions of components such as tires, suspension, kinematics and compliance, roll bars, steering, brakes, mass distribution and powertrain and they have the qualification to analyze, to judge and to optimize components with regard to global vehicle behavior.

Content
1. Testing and evaluation methods
2. Fundamentals of vehicle dynamics simulation
3. Execution of virtual test driving and evaluation of the results
4. Influence of several components and optimization of global driving behavior

Workload
regular attendance: 22,5 hours
self-study: 97,5 hours

Literature
2. Unrau, H.-J.: Scriptum zur Vorlesung “Fahreigenschaften I”
4. IPG: User Guide CarMaker
Die folgenden Informationen stammen aus der Veranstaltung Handling Characteristics of Motor Vehicles I (WS 16/17):

The students know the basic connections between drivers, vehicles and environment. They can build up a vehicle simulation model, with which forces of inertia, aerodynamic forces and tyre forces as well as the appropriate moments are considered. They have proper knowledge in the area of tyre characteristics, since a special meaning comes to the tire behavior during driving dynamics simulation. Consequently they are ready to analyze the most important influencing factors on the driving behaviour and to contribute to the optimization of the handling characteristics.

Content
1. Problem definition: Control loop driver - vehicle - environment (e.g. coordinate systems, modes of motion of the car body and the wheels)

2. Simulation models: Creation from motion equations (method according to D’Alembert, method according to Lagrange, programme packages for automatically producing of simulation equations), model for handling characteristics (task, motion equations)

3. Tyre behavior: Basics, dry, wet and winter-smooth roadway

Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature


Die folgenden Informationen stammen aus der Veranstaltung Handling Characteristics of Motor Vehicles II (SS 2016):

The students have an overview of common test methods, with which the handling of vehicles is gauged. They are able to interpret results of different stationary and transient testing methods. Apart from the methods, with which e.g. the driveability in curves or the transient behaviour from vehicles can be registered, also the influences from cross-wind and from uneven roadways on the handling characteristics are well known. They are familiar with the stability behavior from single vehicles and from vehicles with trailer. Consequently they are ready to judge the driving behaviour of vehicles and to change it by specific vehicle modifications.

Content
1. Vehicle handling: Bases, steady state cornering, steering input step, single sine, double track switching, slalom, cross-wind behavior, uneven roadway

2. stability behavior: Basics, stability conditions for single vehicles and for vehicles with trailer

Workload
regular attendance: 22,5 hours
self-study: 97,5 hours

Literature

Die folgenden Informationen stammen aus der Veranstaltung Advanced powder metals (SS 2016):
The students know the basics of powder metallurgy. They are able to assess the conditions for applying either powder metallurgy or competing production methods. They have knowledge on production, properties and application of the most important PM materials.

Content
The lecture gives an overview on production, properties and application of structural and functional powder metallurgy material. The following groups of materials are presented: PM High Speed Steels, Cemented Carbides, PM Metal Matrix Composites, PM Specialities, PM Soft Magnetic and Hard Magnetic Materials.

Workload
regular attendance: 22 hours
self-study: 98 hours

Literature
- R.M. German. "Powder metallurgy and particulate materials processing. Metal Powder Industries Federation, 2005
Course: Human Resource Management [T-WIWI-102909]

Responsibility: Petra Nieken

Contained in: [M-WIWI-101513] Human Resources and Organizations

ECTS 4,5

Version 1

Events

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<tr>
<td>WS 16/17</td>
<td>2573003</td>
<td>Personalmanagement</td>
<td>Vorlesung (V)</td>
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<td>Petra Nieken</td>
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<td></td>
<td>2573004</td>
<td>Übung zu Personalmanagement</td>
<td>Übung (Ü)</td>
<td>1</td>
<td>Petra Nieken, Mitarbeiter</td>
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</table>

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Conditions
None

Recommendations
Completion of module Business Administration is recommended.
Basic knowledge of microeconomics, game theory, and statistics is recommended.
Course: Hydraulic Engineering and Water Management [T-BGU-101667]

Responsibility: Franz Nestmann

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS: 4
Version: 1

Conditions
none
# Course: Hydro Power Engineering [T-BGU-100139]

**Responsibility:** Peter Oberle  
**Contained in:** [M-WIWI-101404] Extracurricular Module in Engineering  

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<td>SS 2016</td>
<td>6222802</td>
<td>Übungen zu Energiewasserbau</td>
<td>Übung (U)</td>
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<td>SS 2016</td>
<td>6222801</td>
<td>Energiewasserbau</td>
<td>Vorlesung (V)</td>
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<td>Peter Oberle</td>
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</tbody>
</table>
Course: Hydrology [T-BGU-101693]

Responsibility: Erwin Zehe

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS: 4
Version: 1

Conditions
none

Recommendations
None

Remarks
None

Responsibility:  Jörg Föller

Contained in:  [M-MACH-101269] Introduction to Technical Logistics

Events

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<tr>
<td>SS 2016</td>
<td>2118089</td>
<td>Application of technical logistics in sorting- and distribution technology</td>
<td>Block-Vorlesung (BV)</td>
<td>2</td>
<td>Jörg Föller</td>
</tr>
</tbody>
</table>

Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Application of technical logistics in sorting- and distribution technology (SS 2016):

Students are able to:

- Describe and classify basics and characteristics of application of sorting and distribution of goods,
- Solve drive and control tasks with appropriate concept selection,
- Design systems with appropriate calculation methods and evaluate them financially, and
- Judge about the confirmity of the system by using relevant standards and set of rules.

Content

Basics of goods sorting and distribution technology, employment characteristics, classification, interpretation, dimensioning, costs considerations. Relevant control, modern sets of rules and propulsion principles

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

None.
**Course: Industrial Application of Technological Logistics Instancing Crane Systems [T-MACH-105149]**

**Responsibility:** Markus Golder  
**Contained in:** [M-MACH-101269] Introduction to Technical Logistics

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**Conditions**

none
### Course: Industrial Organization [T-WIWI-102844]

**Responsibility:** Johannes Philipp Reiß  
**Contained in:**  
[M-WIWI-101499] Applied Microeconomics  
[M-WIWI-101501] Economic Theory

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#### Events

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<td>2560239</td>
<td>Übung zu Industrieökonomie</td>
<td>Übung (U)</td>
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<td>Markus Fels, Johannes Philipp Reiß</td>
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<td>SS 2016</td>
<td>2560238</td>
<td>Industrial Organization</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Markus Fels, Johannes Philipp Reiß</td>
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</table>

#### Learning Control / Examinations

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.

#### Conditions

None

#### Recommendations

Completion of the module Economics [WW1VWL] is assumed.

Die folgenden Informationen stammen aus der Veranstaltung Industrial Organization (SS 2016):

The student

- understands the basic problems relating to imperfect competition and its policy implications,
- has basic skills of the game-theoretic and microeconomic modeling used in the field of Industrial Organization,
- applies these skills in the analysis of typical problems of Industrial Organization,
- understands the scope and implications of strategic behavior of firms in various market settings.

#### 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:**
Course: Information Engineering [T-MACH-102209]

Responsibility: Jivka Ovtcharova

Contained in: [M-MACH-101270] Product Lifecycle Management

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### Events

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<tr>
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<td>2122014</td>
<td>Information Engineering</td>
<td>Seminar (S)</td>
<td>2</td>
<td>Jivka Ovtcharova, Mitarbeiter</td>
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</tbody>
</table>
## Course: Information management in production [T-MACH-105937]

**Responsibility:** Oliver Riedel  
**Contained in:** [M-MACH-101270] Product Lifecycle Management

### Events

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<td>SS 2016</td>
<td>2122400</td>
<td>Information Management in Production</td>
<td>Block-Vorlesung (BV)</td>
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**ECTS:** 4  
**Version:** 1
Course: Information Systems and Supply Chain Management [T-MACH-102128]

Responsibility: Christoph Kilger

Contained in: [M-MACH-101269] Introduction to Technical Logistics

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<td>SS 2016</td>
<td>2118094</td>
<td>Information Systems in Logistics and Supply Chain Management</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Christoph Kilger</td>
</tr>
</tbody>
</table>

Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Information Systems in Logistics and Supply Chain Management (SS 2016):

Students are able to:

- Describe requirements of logistical processes regarding IT systems,
- Choose information systems to support logistical processes and use them according to the requirements of a supply chain.

Content

1) Overview of logistics systems and processes
2) Basic concepts of information systems and information technology
3) Introduction to IS in logistics: Overview and applications
4) Detailed discussion of selected SAP modules for logistics support

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

Die folgenden Informationen stammen aus der Veranstaltung Integrated production planning (SS 2016):

The students …

- can discuss basic questions of production technology.
- are able to apply the methods of integrated production planning they have learned about to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about for a specific problem.
- can apply the learned methods of integrated production planning to new problems.
- can use their knowledge targeted for efficient production technology.

Content

As part of this lecture further engineering aspects of production technology are taught. This includes content from the manufacturing technology, machine tools and handling techniques as well as the organization and planning.

Planning factories within the context of value networks and integrated production systems (Toyota etc.) requires an integrated perspective for the consideration of all functions included in the “factory” system. This includes the planning of manufacturing systems including the product, the value network and factory production, and the examination of SOPs, the running of a factory and maintenance. Content and theory covered by this lecture are completed with many examples from industry and exercises based on real-life situations and conditions.

Main topics covered by the lecture:

- The basic principles of production planning
- Links between product planning and production planning
- Integrating a production site into a production network
- Steps and methods of factory planning
- Approach to the integrated planning of manufacturing and assembly plants
- Layout of production sites
- Maintenance
- Material flow
- Digital factory
- Process simulation for material flow optimisation
- Start-up

Workload

regular attendance: 63 hours
self-study: 177 hours

Literature

Lecture Notes
Die folgenden Informationen stammen aus der Veranstaltung Integrierte Strategien in Produktion und Entwicklung von Hochleistungsautos (SS 2016):

The students . . .

- are capable to specify the current technological and social challenges in automotive industry.
- are qualified to identify interlinkages between development processes and production systems.
- are able to explain challenges and solutions of global markets and global production of premium products.
- are able to explain modern methods to identify key competences of producing companies.

Content

The lecture deals with the technical and organizational aspects of integrated development and production of sports cars on the example of Porsche AG. The lecture begins with an introduction and discussion of social trends. The deepening of standardized development processes in the automotive practice and current development strategies follow. The management of complex development projects is a first focus of the lecture. The complex interlinkage between development, production and purchasing are a second focus. Methods of analysis of technological core competencies complement the lecture. The course is strongly oriented towards the practice and is provided with many current examples.

The main topics are:

- Introduction to social trends towards high performance cars
- Automotive Production Processes
- Integrated R&D strategies and holistic capacity management
- Management of complex projects
- Interlinkage between R&D, production and purchasing
- The modern role of manufacturing from a R&D perspective
- Global R&D and production
- Methods to identify core competencies

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

Lecture Slides
**Course: International Finance [T-WIWI-102646]**

**Responsibility:** Marliese Uhrig-Homburg

**Contained in:**
- [M-WIWI-101402] eFinance
- [M-WIWI-101465] Topics in Finance I
- [M-WIWI-101423] Topics in Finance II

**ECTS** 3  
**Language** deutsch  
**Version** 1

### Events

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<td>International Finance</td>
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</table>

**Learning Control / Examinations**

See German version.

**Conditions**

None

**Recommendations**

None

**Remarks**

See German version.

*Die folgenden Informationen stammen aus der Veranstaltung International Finance (SS 2016):*

The objective of this course is to become familiar with the basics of investment decisions on international markets and to manage foreign exchange risks.

**Content**

The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor second that, of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore current exchange rate theories are discussed.

**Workload**

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

**Literature**

**Elective literature:**

Course: International Marketing [T-WIWI-102807]

Responsibility: Martin Klarmann

Contained in: [M-WIWI-101424] Foundations of Marketing

ECTS 1.5 Language deutsch
Version 1

Events

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<tr>
<td>WS 16/17</td>
<td>2572155</td>
<td>International Marketing</td>
<td>Vorlesung (V)</td>
<td>1</td>
<td>Sven Feurer</td>
</tr>
</tbody>
</table>

Learning Control / Examinations

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

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

Die folgenden Informationen stammen aus der Veranstaltung International Marketing (WS 16/17):

Students
- know the characteristics of international marketing
- are familiar with the Hofstede’s cultural dimensions theory
- understand basic concepts of cultural learning (the concept of acculturation, the psychic distance paradox)
- know different concepts that explain international buying behavior (e.g. country-of-origin effects)
- comprehend different concepts for market entries in an international context (“waterfall”-strategy, “sprinkler”-strategy, method of analogy, chain ratio method)
- understand what needs to be considered regarding international market research (dealing with ethical dilemmas, challenges regarding primary and secondary data sources, testing measurement equivalence, linguistic equivalence, differences in the response styles of questionnaires)
- know the particularities of international product policy (standardization vs. differentiation, challenge of branding, fight against product plagiarism, brand counterfeiting and product piracy, protection of intellectual property)
- are familiar with the particularities in the international price policy (BigMac Index, how to deal with price demand functions to achieve profit maximization, arbitrage, price corridor, standardization vs. differentiation of prices, how to deal with currency risks, inflation, exchange rates and different willingness to pay)
- know the characteristics of the international communication policy (different laws, problems regarding international standardized campaigns)
- know particularities of the international sales policy (international channels, differences of contract negotiations)
- are able to organize international marketing departments and subsidiaries
- know the problems of marketing in emerging markets

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.

Workload

The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature

Course: Internship [T-WIWI-102611]

Responsibility: Martin Ruckes

Contained in: [M-WIWI-101419] Internship

ECTS 10  SWS 8  Version 1

Learning Control / Examinations
see module description

Conditions
Kein
Course: Introduction to Ceramics [T-MACH-100287]

Responsibility: Michael Hoffmann

Contained in: [M-MACH-101262] Emphasis Materials Science

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<tbody>
<tr>
<td>WS 16/17</td>
<td>2125757</td>
<td>Introduction to Ceramics</td>
<td>Vorlesung (V)</td>
<td>3</td>
<td>Michael Hoffmann</td>
</tr>
</tbody>
</table>

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Introduction to Ceramics (WS 16/17):

The students know the most relevant crystal structures and defects of non metallic inorganic materials, are able to read binary and ternary phase diagrams and are familiar with powdertechological shaping techniques, sintering and grain growth. They know the basics of the linear elastic fracture mechanics, are familiar with Weibull statistics, K-concept, subcritical crack growth, creep and the opportunities for microstructural reinforcement of ceramics. The students are able to explain the correlation among chemical bonding, crystal and defect structures and the electrical properties of ceramics.

Content
After a short introduction to interatomic bonding, fundamental concepts of crystallography, the stereographic projection and the most important symmetry elements will be given. Different types of crystal structures are explained and the relevance of imperfections are analysed with respect to the mechanical and electrical properties of ceramics. Then, the impact of surfaces, interfaces and grain boundaries for the preparation, microstructural evolution and the resulting properties is discussed. Finally, an introduction is given to ternary phase diagrams.

The second part of the course covers structure, preparation and application aspects of nonmetallic inorganic glasses, followed by an introduction to the properties and processing methods of fine-grained technical powders. The most relevant shaping methods, such as pressing, slip casting, injection moulding and extrusion are introduced. Subsequently, the basics of science of sintering and the mechanisms for normal and abnormal grain growth are discussed. Mechanical properties of ceramics are analysed using basic principles of linear elastic fracture mechanics, Weibull statistics, concepts for subcritical crack growth and creep models to explain the behaviour at elevated temperatures. Furthermore it is demonstrated that mechanical properties can be significantly enhanced by various types of microstructural toughening mechanisms. The electronic and ionic conductivity of ceramic materials are explained based on defect-chemical considerations and band structure models. Finally, the characteristics of a dielectric, pyroelectric, and piezoelectric behaviour is discussed.

Workload
regular attendance: 45 hours
self-study: 135 hours

Literature
- Kingery, Bowen, Uhlmann, “Introduction To Ceramics”, Wiley
- Y.-M. Chiang, D. Birnie III and W.D. Kingery, “Physical Ceramics”, Wiley
Course: Introduction to Energy Economics [T-WIWI-102746]

Responsibility: Wolf Fichtner

Contained in: [M-WIWI-101464] Energy Economics

ECTS: 5.5

Events

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<tr>
<td>SS 2016</td>
<td>2581010</td>
<td>Introduction to Energy Economics</td>
<td>Vorlesung (V)</td>
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<td>Wolf Fichtner</td>
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<tr>
<td>SS 2016</td>
<td>2581011</td>
<td>Übungen zu Einführung in die Energiewirtschaft Übung (Ü)</td>
<td>2</td>
<td>Hannes Schwarz, Patrick Jochem</td>
<td></td>
</tr>
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</table>

Learning Control / Examinations

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

Conditions

None

The following Informationen stammen aus der Veranstaltung Introduction to Energy Economics (SS 2016):

The student is able to

- characterize and judge the different energy carriers and their peculiarities,
- understand contexts related to energy economics.

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. Umweltekonomie und Umweltpolitik. ISBN 3-8006-2187-8

Responsibility: Alexander Fidlin


ECTS 3
Language deutsch
Version 1

Events

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<tr>
<td>SS 2016</td>
<td>2162239</td>
<td>Übungen zu Einführung in die Technische Mechanik I: Statik und Festigkeitslehre</td>
<td>Übung (Ü)</td>
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<td>Jens Deppler, Alexander Fidlin, Olga Drozdetskaya</td>
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<td>SS 2016</td>
<td>2162238</td>
<td>Introduction to Engineering Mechanics I : Statics and Strength of Materials</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Jens Deppler, Alexander Fidlin, Olga Drozdetskaya</td>
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</table>

Learning Control / Examinations
The assessment consists of a written examination taking place in the recess period (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.
Permitted utilities: non-programmable calculator, literature

Conditions
None


The student
- knows and understoods the basic elements of statics,
- is able to solve basic calculations in statics independently.

Content
Statics: force · moment · general equilibrium conditions · center of mass · inner force in structure · plane frameworks · theory of adhesion
Course: Introduction to Engineering Mechanics II : Dynamics [T-MACH-102210]

Responsibility: Alexander Fidlin

[M-MACH-101261] Emphasis in Fundamentals of Engineering

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<tr>
<td>WS 16/17</td>
<td>2161276</td>
<td>Introduction to Engineering Mechanics II : Dynamics</td>
<td>Vorlesung (V)</td>
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<td>Alexander Fidlin</td>
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</table>

Learning Control / Examinations
The assessment consists of a written examination (75 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination is offered every semester. Re-examinations are offered at every ordinary examination date.
Permitted utilities: non-programmable calculator, literature.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Introduction to Engineering Mechanics II : Dynamics (WS 16/17):
Der Studierende versteht die grundlegenden Elemente der Technischen Dynamik. Er ist in der Lage einfache dynamische Modelle aufzustellen und Berechnungen selbständig durchzuführen.

Content
- Kinematische Grundbegriffe
- Kinetik des Massenpunktes
- Kinematik starrer Körper
- Ebene
- Kinetik des starren Körpers
- Stoßvorgänge
- Schwingungssysteme

Workload
Gesamtaufwand bei 4,5 LP ca. 90 Std.
- Präsenz: 45 Stunden
- Vor-/Nachbereitung: 20 Stunden
- Prüfung und Prüfungsvorbereitung: 25 Stunden
Course: Introduction to Game Theory [T-WIWI-102850]

Responsibility: Clemens Puppe, Johannes Philipp Reiß
Contained in: [M-WIWI-101499] Applied Microeconomics
[M-WIWI-101501] Economic Theory

ECTS 4,5
Language deutsch
Version 1

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<tr>
<td>SS 2016</td>
<td>2520526</td>
<td>Übungen zu Einführung in die Spieltheorie</td>
<td>Übung (U)</td>
<td>1</td>
<td>Clemens Puppe, Jana Rollmann</td>
</tr>
<tr>
<td>SS 2016</td>
<td>2520525</td>
<td>Introduction to Game Theory</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Clemens Puppe, Jana Rollmann</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
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.

Conditions
None

Recommendations
Basic knowledge of mathematics and statistics is assumed.

Die folgenden Informationen stammen aus der Veranstaltung Introduction to Game Theory (SS 2016):

This course offers an introduction to the theoretical analysis of strategic interaction situations. At the end of the course, students 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.

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:
Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-101681]

Responsibility: Sven Wursthorn, Norbert Rösch

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

Modeled Conditions

The following conditions must be met:

- Successful completion of course [T-BGU-103541] Introduction to GIS for Students of Natural, Engineering and Geo Sciences is required before taking this course.
Course: Introduction to GIS for Students of Natural, Engineering and Geo Sciences [T-BGU-103541]

Responsibility: Sven Wursthorn, Norbert Rösch

Contained in:
[M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
[M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS 3  Version 1
**Course: Introduction to Microsystem Technology I [T-MACH-105182]**

**Responsibility:** Jan Gerrit Korvink, Andreas Guber

**Contained in:** [M-MACH-101287] Microsystem Technology

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<tbody>
<tr>
<td>WS 16/17</td>
<td>2141861</td>
<td>Introduction to Microsystem Technology I</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Jan Gerrit Korvink</td>
</tr>
</tbody>
</table>

*Die folgenden Informationen stammen aus der Veranstaltung Introduction to Microsystem Technology I (WS 16/17):*

The lecture gives an introduction into the basics of microsystems technology. In analogy to processes employed in fabrication of microelectronics circuits the core technologies as well as materials for producing microstructures and components are presented. Finally, various techniques for Silicon micromachining are explained and illustrated with examples for micro-components and micro-systems.

**Content**
- Introduction in Nano- and Microtechnologies
- Silicon and processes for fabricating microelectronics circuits
- Basic physics background and crystal structure
- Materials for micromachining
- Processing technologies for microfabrication
- Silicon micromachining
- Examples

**Workload**

- Literature: 20 h
- Lessons: 21 h
- Preparation and Review: 50 h
- Exam preparation: 30 h

**Literature**

M. Madou

Fundamentals of Microfabrication

Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011
Course: Introduction to Microsystem Technology II [T-MACH-105183]

Responsibility: Andreas Guber

Contained in: [M-MACH-101287] Microsystem Technology

Events

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<th>Lecturers</th>
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<tr>
<td>SS 2016</td>
<td>2142874</td>
<td>Introduction to Microsystem Technology II</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Jan Gerrit Korvink, Oliver Gruschke</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Introduction to Microsystem Technology II (SS 2016):

The lecture gives an introduction into the basics of microsystems technology. In the first part, methods for lithographic pattern transfer are summarized. Then specific techniques such as the LIGA process, micro-machining, and laser-patterning are explained and examples are given. Finally assembly and packaging methods are presented leading into a discussion of entire microsystems.

Content
- Introduction in Nano- and Microtechnologies
- Lithography
- LIGA-technique
- Mechanical microfabrication
- Patterning with lasers
- Assembly and packaging
- Microsystems

Workload
Literature: 20 h
Lessons: 21 h
Preparation and Review: 50 h
Exam preparation: 30 h

Literature
M. Madou
Fundamentals of Microfabrication
Taylor & Francis Ltd.; Auflage: 3. Auflage. 2011
### Course: Introduction to Operations Research I and II [T-WIWI-102758]

**Responsibility:** Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel

**Contained in:** [M-WIWI-101418] Introduction to Operations Research

**ECTS** 9  
**Language** deutsch  
**Version** 1

#### Events

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<tr>
<td>SS 2016</td>
<td>2550040</td>
<td>Introduction to Operations Research I</td>
<td>Vorlesung (V)</td>
<td>2+2</td>
<td>Oliver Stein</td>
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</table>

#### Learning Control / Examinations

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.

#### Conditions

None

#### Recommendations

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].

#### 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 Arbeitssaufwand eines durchschnittlichen Studenten ist anzustreben.

#### Literature

Course: Introduction to Programming with Java [T-WIWI-102735]

Responsibility: Johann Marius Zöllner, N.N.

Contained in: [M-WIWI-101581] Introduction to Programming

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<tr>
<td>WS 16/17</td>
<td>2511000</td>
<td>Introduction to Programming with Java</td>
<td>Vorlesung (V)</td>
<td>3</td>
<td>N.N.</td>
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<tr>
<td>WS 16/17</td>
<td>2511004</td>
<td>Tutorien zu Programmieren I: Java</td>
<td>Tutorium (Tu)</td>
<td>1</td>
<td>Jonas Lehner, Niklas Kühl, N. N.</td>
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</tbody>
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Learning Control / Examinations
The assessment consists of a written resp. computer-based exam (60 min) according to Section 4 (2),1 of the examination regulation. The successful completion of the compulsory tests in the computer lab is prerequisite for admission to the written resp. computer-based exam. The examination takes place every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None

Remarks
see German version

Die folgenden Informationen stammen aus der Veranstaltung Introduction to Programming with Java (WS 16/17):
see German version

Content
see German version

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

Literature
**Course: Introduction to Track Guided Transport Systems [T-BGU-104580]**

**Responsibility:** Eberhard Hohnecker

**Contained in:** [M-BGU-102283] Introduction to Track Guided Transport Systems

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**Events**

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<td>SS 2016</td>
<td>6234803</td>
<td>Übungen zu Anlagen und Fahrzeuge des öffentlichen Verkehrs</td>
<td>Übung (Ü)</td>
<td>1</td>
<td>Mitarbeiter/innen, Eberhard Hohnecker</td>
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<td>SS 2016</td>
<td>6234801</td>
<td>Betrieb spurgeführter Systeme</td>
<td>Vorlesung (V)</td>
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<td>Eberhard Hohnecker</td>
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<td>SS 2016</td>
<td>6234802</td>
<td>Anlagen und Fahrzeuge des öffentlichen Verkehrs</td>
<td>Vorlesung (V)</td>
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<td>Eberhard Hohnecker</td>
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</table>

**Conditions**

none
Course: Investments [T-WIWI-102604]

Responsibility: Marliese Uhrig-Homburg

Contained in: [M-WIWI-101435] Essentials of Finance

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<td>SS 2016</td>
<td>2530576</td>
<td>Übung zu Investments</td>
<td>Übung (Ü)</td>
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<td>Marliese Uhrig-Homburg, Marcel Müller</td>
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<td>SS 2016</td>
<td>2530575</td>
<td>Investments</td>
<td>Vorlesung (V)</td>
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<td>Marliese Uhrig-Homburg</td>
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</table>

Learning Control / Examinations

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. By submitting the exercises (according to Section 4(2), 3 of the examination regulation) up to 4 bonus points can be acquired.

Conditions

None

Recommendations

Knowledge of Business Administration: Finance and Accounting [2610026] is recommended.

Die folgenden Informationen stammen aus der Veranstaltung Investments (SS 2016):

The objective of this course is to become familiar with the basics of investment decisions on stock and bond markets. Basic economic concepts and models are discussed and applied on introductory level. Interlinkages between markets, different decision makings concepts and models are demonstrated.

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:
Course: Knowledge Discovery [T-WIWI-102666]

Responsibility: Rudi Studer

Contents: Electives in Informatics

ECTS: 5

Language: englisch

Version: 1

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<td>WS 16/17</td>
<td>2511303</td>
<td>Exercises to Knowledge Discovery</td>
<td>Übung (U)</td>
<td>1</td>
<td>Aditya Mogadala, Achim Rettinger, Rudi Studer</td>
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<tr>
<td>WS 16/17</td>
<td>2511302</td>
<td>Knowledge Discovery</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Achim Rettinger, Rudi Studer</td>
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</table>

Learning Control / Examinations

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation. Students can be awarded a bonus on their final grade if they successfully complete special assignments.

Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Knowledge Discovery (WS 16/17):

Students

- know fundamentals of Machine Learning, Data Mining and Knowledge Discovery.
- are able to design, train and evaluate adaptive systems.
- conduct Knowledge Discovery projects in regards to algorithms, representations and applications.

Content

Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empirical evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others featurevector-based learning, text mining and social network analysis.

Workload

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours

Literature

- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley
Course: Knowledge Management [T-WIWI-102664]

Responsibility: Rudi Studer

Contained in: [M-WIWI-101399] Emphasis Informatics
[M-WIWI-101426] Electives in Informatic

ECTS 4 Language deutsch Version 1

Events

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<tr>
<td>WS 16/17</td>
<td>2511301</td>
<td>Exercises to Knowledge Management</td>
<td>Übung (U)</td>
<td>1</td>
<td>Rudi Studer, Sebastian Bader, Andreas Harth, Stefan Zander, Andreas Thalhammer</td>
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<tr>
<td>WS 16/17</td>
<td>2511300</td>
<td>Knowledge Management</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Rudi Studer, Andreas Harth, Stefan Zander</td>
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</table>

Learning Control / Examinations
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.

Conditions
None

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

Die folgenden Informationen stammen aus der Veranstaltung Knowledge Management (WS 16/17):

Students
- know different application domains of knowledge management
- know different (specifically semantic and social) technologies of knowledge management
- are able to judge the applicability of business software with regard to aspects of knowledge management
- are able to judge the long term value of knowledge management in organisations and compare it to possible costs

Content
The lecture will emphasize computer-based support for knowledge management, such as:
- Ontology-based Knowledge Management
- Communities of Practice, Collaboration Tools, Social Software
- Business-process Oriented Knowledge Management
- Personal Knowledge Management
- Case Based Reasoning (CBR)
- Linked Open Data

Workload
- The total workload for this course is approximately 120 hours
- Time of presentness: 30 hours
- Time of preparation and postprocessing: 90 hours

Literature
Additional literature:

Course: Logistics - Organisation, Design and Control of Logistic Systems [T-MACH-102089]

Responsibility: Kai Furmans

Contained in: [M-WIWI-101421] Supply Chain Management

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<td>SS 2016</td>
<td>2118078</td>
<td>Logistics - Organisation, Design, and Control of Logistic Systems</td>
<td>Vorlesung (V)</td>
<td>3</td>
<td>Kai Furmans</td>
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Learning Control / Examinations
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation. The grade of the exam may be improved by passing case studies.

Conditions
None

Recommendations
Required are lectures on “Linear Algebra” and “Stochastic”.


Students are able to:
- Describe logistical tasks,
- Design logistical systems suitable to the respective task,
- Dimension stocastical stock models,
- Determine essential influencing parameters on the bullwhip effect and
- Use optimizing solution methods.

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**

**Elective literature:**
- Arnold/Isermann/Kuhn/Tempelmeier. Handbuch Logistik, Springer Verlag, 2002 (Neuauflage in Arbeit)
- Domschke. Logistik, Rundreisen und Touren, Oldenbourg Verlag, 1982
- Domschke/Drexel. Logistik, Standorte, Oldenbourg Verlag, 1996
- Gudehus. Logistik, Springer Verlag, 2007
- Tempelmeier. Bestandsmanagement in Supply Chains, Books on Demand 2006
**Course: Logistics and Supply Chain Management [T-WIWI-102870]**

**Responsibility:** Marcus Wiens

**Contained in:** [M-WIWI-101437] Industrial Production I

**ECTS Version**

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**Learning Control / Examinations**

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.

**Conditions**

None
Course: Machine Tools and Industrial Handling [T-MACH-102158]

Responsibility: Jürgen Fleischer

Contained in: [M-MACH-101286] Machine Tools and Industrial Handling

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<td>WS 16/17</td>
<td>2149902</td>
<td>Machine Tools and Industrial Handling</td>
<td>Vorlesung (VÜ) / Übung 6</td>
<td></td>
<td>Jürgen Fleischer</td>
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</table>

Learning Control / Examinations

Allgemein
The assessment is carried out as an oral exam. The examination is offered every semester. Reexaminations are offered at every ordinary examination date.

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

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

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

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

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

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

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

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

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

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

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

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

Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Machine Tools and Industrial Handling (WS 16/17):

The students . . .

- are capable to explain the use and application of machine tools and handling devices as well as differentiate their characteristics and structure.
- are able to name and describe the essential components (frame, main spindles, feed axis, peripheral equipment, control) of machine tools.
- Are capable to distinguish and select and describe the essential components regarding structure, characteristics advantages and disadvantages.
- are enabled to dimension the main components of machine tools.
- are able to name and describe the control principles of machine tools.
- are capable to name examples of machine tools and industrial handling as well as to deduce compare the essential components. Additionally they can allocate manufacturing processes.
- are enabled to identify drawbacks as well as derive and asses measures for improvements.
are qualified to apply methods for selection and evaluation of machine tools.
are experienced to deduce the particular failure characteristics of a ball screw.

Content
The lecture provides an overview of machine tool and handling devices structures, use and application areas. Within the lecture based and industrially oriented knowledge for selection, dimensioning and evaluation is conveyed. First the components of machine tools are explained systematically. Here the distinctive features of dimensioning machine tools are deduced followed by the integral dimensioning of machine tools. Subsequently the use of machine tools is shown in exemplary application areas e.g. turning, milling, grinding, metal forming, sheet metal forming and gear cutting.
The lecture provides an inside view of industrial application and is illustrated with current examples.
The topics are as follows:
- Frame and frame components
- Main drives and main spindles
- Requirements for feed axes
- Electro-mechanical feed axis
- Fluidic feed axes
- Control technologies
- Peripheral components
- Metrological assessment
- Machine maintenance
- Process-diagnosis
- Machinery Directiv
- Machine tool examples

Workload
regular attendance: 63 hours
self-study: 177 hours

Literature
Lecture Notes
Course: Management Accounting 1 [T-WIWI-102800]

Responsibility: Marcus Wouters

Contained in: [M-WIWI-101498] Management Accounting

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<td>SS 2016</td>
<td>2579901</td>
<td>Übung zu Management Accounting I</td>
<td>Übung (Ü)</td>
<td>2</td>
<td>Michael Pelz, Marcus Wouters</td>
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<tr>
<td>SS 2016</td>
<td>2579900</td>
<td>Management Accounting 1</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Marcus Wouters</td>
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</table>

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Management Accounting 1 (SS 2016):

Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA1 are: short-term planning, investment decisions, budgeting and activity-based costing. We will use international material written in English. We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information). The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

Literature
- In addition, several papers that will be available on ILIAS.
Course: Management Accounting 2 [T-WWI-102801]

Responsibility: Marcus Wouters

Contained in: [M-WWI-101498] Management Accounting

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<td>WS 16/17</td>
<td>2579903</td>
<td>Übung zu Management Accounting II</td>
<td>Übung (Ü)</td>
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<td>Marcus Wouters, Ana Mickovic</td>
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<td>WS 16/17</td>
<td>2579902</td>
<td>Management Accounting 2</td>
<td>Vorlesung (V)</td>
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<td>Marcus Wouters</td>
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</table>

Learning Control / Examinations
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation) at the end of each semester.

Conditions
None

Recommendations
It is recommended to take part in the course "Management Accounting 1" before this course.

Die folgenden Informationen stammen aus der Veranstaltung Management Accounting 2 (WS 16/17):

Students have an understanding of theory and applications of management accounting topics. They can use financial information for various purposes in organizations.

Content
The course covers topics in management accounting in a decision-making framework. Some of these topics in the course MA2 are: cost estimation, product costing and cost allocation, financial performance measures, transfer pricing, strategic performance measurement systems and customer value propositions.
We will use international material written in English.
We will approach these topics primarily from the perspective of the users of financial information (not so much from the controller who prepares the information).
The course builds on an introductory level of understanding of accounting concepts from Business Administration courses in the core program. The course is intended for students in Industrial Engineering.

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

Literature
- In addition, several papers that will be available on ILIAS.
Course: Management and Strategy [T-WIWI-102629]

Responsibility: Hagen Lindstädt

Contained in: [M-WIWI-101425] Strategy and Organization

ECTS 3.5 Language deutsch Version 1

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<td>SS 2016</td>
<td>2577900</td>
<td>Management and Strategy</td>
<td>Vorlesung (V)</td>
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<td>Bettina Widmann, Hagen Lindstädt</td>
</tr>
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</table>

Learning Control / Examinations
The assessment consists of a written exam (60 min) taking place at the beginn 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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Management and Strategy (SS 2016):

After passing this course students are able to

- prepare strategic decisions along the ideal-typical strategy process in practice (“strategic analysis”).
- assess strategic options.
- explain the portfolio management (Parental advantage and best owner of business entities).
- discuss price and capacity decisions in oligopolies and explain them in examples.

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.

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.
Course: Management of Business Networks [T-WIWI-102598]

Responsibility: Christof Weinhardt

Contained in: [M-WIWI-101434] eBusiness and Service Management
[M-WIWI-101421] Supply Chain Management

ECTS 4.5 Language englisch Version 1

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<td>WS 16/17</td>
<td>2590453</td>
<td>Übungen zu Management of Business Networks</td>
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<td>WS 16/17</td>
<td>2590452</td>
<td>Management of Business Networks</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Christoph Flath, Christof Weinhardt</td>
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</table>

Learning Control / Examinations

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). 65% of the final grade is based on the written exam and 35% is based on assignments from the exercises. Successful completion of the exercises is a prerequisite for admission to the written exam. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Conditions

None

Recommendations

None

Die folgenden Informationen stammen aus der Veranstaltung Management of Business Networks (WS 16/17):

The student

- identifies the coordination problems in a business network,
- explains the theory of strategic and operative management,
- analyses case studies in logistics considering the organization theory and network analysis,
- argues and constructs new solutions for the case studies by means of electronic tools.

Content

The significant and lasting impact of web-based business-to-business (B2B) networks has just recently become apparent. The exploratory phase during the first Internet hype bred a variety of approaches which were often bold in business nature, yet simple and unfounded in system architecture. Only very few survived and proved sustainable. Nowadays web-based B2B networks are increasingly reappearing and even promoted by major traditional companies and governments. However, this new wave of networks is more mature and more powerful in functionality than their predecessors. As such they provide not only auction systems but also facilities for electronic negotiation. This implies a shift from price-focused to relationship-oriented trading. But what motivates this shift? Why do firms enter business networks? How can these networks be best supported by IT? The course intends to resolve these questions. Firstly, an introduction in organization theory will be given. Secondly, the problems of networks will be addressed. Thirdly, an analysis of how IT can alleviate those problems will be undertaken.

Workload

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

Literature

Course: Management of Business Networks (Introduction) [T-WIWI-102760]

Responsibility: Christof Weinhardt

Contained in: [M-WIWI-101421] Supply Chain Management

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<td>WS 16/17</td>
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<td>Christoph Flath, Christof Weinhardt</td>
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</table>

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

Conditions
None

Recommendations
None

Remarks
This version of the MBN course does not include the case study in the second part of the lecture, so that it is worth less credits.

Die folgenden Informationen stammen aus der Veranstaltung Management of Business Networks (Introduction) (WS 16/17):

The student
- identifies the coordination problems in a business network,
- explains the theory of strategic and operative management,
- analyses case studies in logistics considering the organization theory and network analysis,
- argues and constructs new solutions for the case studies by means of electronic tools.

Content
The significant and lasting impact of web-based business-to-business (B2B) networks has just recently become apparent. The exploratory phase during the first Internet hype bred a variety of approaches which were often bold in business nature, yet simple and unfounded in system architecture. Only very few survived and proved sustainable. Nowadays web-based B2B networks are increasingly reappearing and even promoted by major traditional companies and governments. However, this new wave of networks is more mature and more powerful in functionality than their predecessors. As such they provide not only auction systems but also facilities for electronic negotiation. This implies a shift from price-focused to relationship-oriented trading. But what motivates this shift? Why do firms enter business networks? How can these networks be best supported by IT? The course intends to resolve these questions. Firstly, an introduction in organization theory will be given. Secondly, the problems of networks will be addressed. Thirdly, an analysis of how IT can alleviate those problems will be undertaken.

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

Literature
Course: Management of IT-Projects [T-WIWI-102667]

Responsibility: Roland Schätzle

Contained in: [M-WIWI-101630] Electives in Informatics  
[M-WIWI-101628] Emphasis in Informatics

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<td>Management of IT-Projects</td>
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<td>Roland Schätzle</td>
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<td>SS 2016</td>
<td>2511215</td>
<td>Übungen zu Management von Informatik-Projekten</td>
<td>Übung (Ü)</td>
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<td>Roland Schätzle</td>
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Learning Control / Examinations

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

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Management of IT-Projects (SS 2016):

Students
- explain the terminology of IT project management and typical used methods for planning, handling and controlling,
- apply methods appropriate to current project phases and project contexts,
- consider organisational and social impact factors.

Content
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:
- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrasctructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam &1h

Total: 150h
Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004

Further literature is given in each lecture individually.
**Course: Managing Organizations [T-WIWI-102630]**

**Responsibility:** Hagen Lindstädt

**Contained in:**
- [M-WIWI-101513] Human Resources and Organizations
- [M-WIWI-101425] Strategy and Organization

**ECTS** 3.5  **Language** deutsch  **Version** 1

### Events

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<td>WS 16/17</td>
<td>2577902</td>
<td>Managing Organizations</td>
<td>Vorlesung (V)</td>
<td>2</td>
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### Learning Control / Examinations

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.

### Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Managing Organizations (WS 16/17):

After passing this course students are able to

- evaluate strengths and weaknesses of existing organisational structures and rules.
- compare alternatives of organisational structure in practice and assess and interpret them regarding their effectiveness and efficiency.
- assess the management of organisational changes.

### 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.

### 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.
Course: Managing the Marketing Mix [T-WIWI-102805]

Responsibility: Martin Klarmann
Contained in: [M-WIWI-101424] Foundations of Marketing

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<tr>
<td>SS 2016</td>
<td>2571153</td>
<td>Übung zu Marketing Mix (Bachelor)</td>
<td>Übung (Ü)</td>
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<td>Maximilian Lüders, Verena Rieger</td>
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<td>SS 2016</td>
<td>2571152</td>
<td>Managing the Marketing Mix</td>
<td>Vorlesung (V)</td>
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<td>Martin Klarmann</td>
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Learning Control / Examinations
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions
None

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

Die folgenden Informationen stammen aus der Veranstaltung Managing the Marketing Mix (SS 2016):

See German version.

Content
The content of this course concentrates on the four elements of the marketing mix. Therefore the four main chapters are:

- Product management
- Pricing
- Promotion
- Sales management

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

Literature
Course: Manufacturing Technology [T-MACH-102105]

Responsibility: Frederik Zanger, Volker Schulze

Contained in: [M-MACH-101276] Manufacturing Technology

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<td>WS 16/17</td>
<td>2149657</td>
<td>Manufacturing Technology</td>
<td>Vorlesung (VÜ) / Übung 6</td>
<td>6</td>
<td>Frederik Zanger, Volker Schulze</td>
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Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Manufacturing Technology (WS 16/17):

The students . . .

- are capable to specify the different manufacturing processes and to explain their functions.
- are able to classify the manufacturing processes by their general structure and functionality according to the specific main groups.
- have the ability to perform a process selection based on their specific characteristics.
- are enabled to identify correlations between different processes and to select a process regarding possible applications.
- are qualified to evaluate different processes regarding specific applications based on technical and economic aspects.
- are experienced to classify manufacturing processes in a process chain and to evaluate their specific influence on surface integrity of workpieces regarding the entire process chain.

Content

The objective of the lecture is to look at manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to impart detailed process knowledge of the common processes. The lecture covers the basic principles of manufacturing technology and deals with the manufacturing processes according to their classification into main groups regarding technical and economic aspects. The lecture is completed with topics such as process chains in manufacturing.

The following topics will be covered:

- Quality control
- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming, plastics engineering)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment
- Process chains in manufacturing

This lecture provides an excursion to an industry company.

Workload

regular attendance: 63 hours
self-study: 177 hours

Literature

Lecture Notes
**Course: Markov Decision Models I [T-WIWI-102710]**

**Responsibility:** Karl-Heinz Waldmann  

**Contained in:**  
- [M-WIWI-101414] Methodical Foundations of OR  
- [M-WIWI-101400] Stochastic Methods and Simulation

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### ECTS 5  
**Language** deutsch  
**Version** 1

#### Events

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<td>Markov Decision Models I</td>
<td>Vorlesung (V)</td>
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<td>WS 16/17</td>
<td>2550681</td>
<td>Rechnerübungen zu Stochastische Entscheidungsmodelle I</td>
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<td>Ellen Platt, Karl-Heinz Waldmann, André Lust</td>
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**Learning Control / Examinations**

The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

**Conditions**  
None

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*Die folgenden Informationen stammen aus der Veranstaltung Markov Decision Models I (WS 16/17):*

The participants will be enabled to model and analyze stochastic systems with modern techniques. The discussion of practice-oriented case studies pursues two goals. On the one hand, typical problem settings are illustrated and on the other hand, criteria for the evaluation of the performance of stochastic systems are motivated. Properties and characteristics for the evaluation of the performance of Markov Chains, Poisson Processes and queuing systems are developed.

**Content**  
Markov Chains, Poisson Processes, Markov Chains in Continuous Time, Queuing Systems

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

**Literature**

- Elective literature:  
Course: Markov Decision Models II [T-WIWI-102711]

Responsibility: Karl-Heinz Waldmann

Contained in: [M-WIWI-101400] Stochastic Methods and Simulation
[M-WIWI-101840] Stochastic Methods and Simulation

ECTS 4,5 Language deutsch Version 1

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Learning Control / Examinations
The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Conditions
None

Recommendations
Foundations in the field of the Markov Decision Models I [2550679] are desired.

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Die folgenden Informationen stammen aus der Veranstaltung Markov Decision Models II (SS 2016):
The participants will be enabled to utilize Markov Decision Processes as a method for analyzing, controlling and optimizing dynamic stochastic systems. The discussion of practice-oriented case studies in the area of the management of energy systems, revenue management and logistics illustrates the application fields of Markov Decision Processes. Necessary mathematical concepts like theoretical foundations, optimality criteria and the solution of the optimality equation are presented. Particularly the development of simple structured decision rules, that are desired by practitioners on the one hand, and that permit the efficient solutions of the optimality equation on the other hand, are discussed. The facultative computer exercise course using the programming language Java comprises a practice-oriented case study that illustrates the opportunities of the optimization of stochastic systems.

Content
Queuing Systems, Stochastic Decision Processes

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

Literature
Course: Material Flow in Logistic Systems [T-MACH-102151]

Responsibility: Kai Furmans

Contained in: [M-MACH-101269] Introduction to Technical Logistics

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<td>WS 16/17</td>
<td>2117051</td>
<td>Material flow in logistic systems</td>
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Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Material flow in logistic systems (WS 16/17):

Students are able to:

- describe material flow processes qualitativ and quantitativ,
- assign possibilities of technical solutions to a open operational task,
- plan material flow systems, illustrate them in simple models and analyse them regarding their performance,
- use methods to determine performance indicators like throughput, utilization, etc., and
- evaluate material flow systems regarding performance and availability.

Content

- elements of material flow systems (conveyor elements, fork, join elements)
- models of material flow networks using graph theory and matrices
- queueing theory, calculation of waiting time, utilization
- warehousing and order-picking
- shuttle systems
- sorting systems
- simulation
- calculation of availability and reliability
- value stream analysis

Workload

regular attendance: 42 hours
self-study: 138 hours

Literature

Arnold, Dieter; Furmans, Kai : Materialfluss in Logistiksystemen; Springer-Verlag Berlin Heidelberg, 2009

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Material Science II for Business Engineers [T-MACH-102079]

Responsibility: Michael Hoffmann

Contains in:
- [M-MACH-101261] Emphasis in Fundamentals of Engineering
- [M-MACH-101262] Emphasis Materials Science

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<td>2126782</td>
<td>Materials Science II for Business Engineers</td>
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**Learning Control / Examinations**

The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the winter term is carried out by a written or oral exam.

**Conditions**

The module *Material Science* has to be completed beforehand.

**Modeled Conditions**

The following conditions must be met:
- Successful completion of module [M-MACH-101260] *Materials Science* is required before taking this course.

---

Die folgenden Informationen stammen aus der Veranstaltung Materials Science II for Business Engineers (SS 2016):

Students know how to read binary phase diagrams and are able to explain the microstructural evolution of metallic and ceramic materials under equilibrium and non-equilibrium conditions. They know the most important alloys of iron-, aluminium-, and copper-based materials. Students are aware of the principle structures of polymers, non metallic inorganic glasses and ceramics and are able to derive differences in materials properties.

**Content**

The course gives an overview of different heat treatments for steels to obtain defined microstructures such as martensite or pearlite and discusses their impact on the mechanical properties. Different thermally activated processes, such as diffusion, creep, recovery and recrystallization are introduced and analyzed and terms of their relevance for materials engineering. Heat treatments and thermally activated processes are also related to aluminium and copper alloys. The second part of the course covers structure, processing and applications of polymers, nonmetallic inorganic glasses and ceramics. Finally an overview is given of the most important materials testing methods.

**Workload**

regular attendance: 32 hours
self-study: 118 hours

**Literature**

Elective literature:
- Werkstoffwissenschaften, Schatt, Werner / Woroch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1
Course: Materials and Processes for Body Lightweight Construction in the Automotive Industry [T-MACH-105166]

Responsibility: Stefan Kienzle, Dieter Steegmüller

Contained in: [M-MACH-101284] Specialization in Production Engineering

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<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry</td>
<td>Vorlesung (V)</td>
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<td>Stefan Kienzle, Dieter Steegmüller</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Materials and Processes for Body Lightweight Construction in the Automotive Industry (WS 16/17):

The students . . .

- are able to name the various lightweight approaches and identify possible areas of application.
- are able to identify the different production processes for manufacturing lightweight structures and explain their functions.
- are able to perform a process selection based on the methods and their characteristics.
- are able to evaluate the different methods against lightweight applications on the basis of technical and economic aspects.

Content

The objective of the lecture is to build up an overview of the relevant materials and processes for the production of a lightweight body. This includes both the actual production and the joining for the body. The lecture covers the different lightweight approaches and possible fields of application in the automotive industry. The methods are discussed with practical examples from the automotive industry.

The following topics will be covered:

- lightweight designs
- aluminum and steel for lightweight construction
- fibre-reinforced plastics by the RTM and SMC process
- joining of steel and aluminum (clinching, riveting, welding)
- bonding
- coating
- finishing
- quality assurance
- virtual factory

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

Lecture Notes
Course: Materials Science I [T-MACH-102078]

Responsibility: Michael Hoffmann

Contents in: [M-MACH-101260] Materials Science

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<td>Vorlesung (V)</td>
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<td>Michael Hoffmann</td>
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Learning Control / Examinations

The assessment consists of a written examination (150 min) taking place in the recess period (according to Section 4(2), 1 of the examination regulation). The examination takes place every semester. Re-examinations are offered at every ordinary examination date. The examination at the end of the summer term is carried out by a written or oral exam.

Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Materials Science I (WS 16/17):

The student

- knows and understands the correlation between atomic structure, microstructure and related macroscopic properties (e.g. mechanical or electrical behaviour)
- has basic knowledge on materials development and characterization

Content

- Atomic structure and interatomic bonding
- Structure of crystalline solids
- Imperfections in solids
- Mechanical behaviour
- Physical properties
- Solidification
- Thermodynamics of heterogeneous systems
- Phase diagrams
- Ferrous alloys

Workload

The total workload for this course is approximately 75.0 hours. For further information see German version.

Literature

Elective literature:


Werkstoffwissenschaften, Schatt, Werner / Worch, Hartmut (Hrsg.) Wiley-VCH, Weinheim, ISBN-10: 3-527-30535-1


Course: Mathematics I - Final Exam [T-MATH-102261]

Responsibility: Günter Last, Steffen Winter, Martin Folkers, Daniel Hug
Contained in: [M-MATH-101676] Mathematics 1

ECTS
Version
Course: Mathematics I - Midterm Exam [T-MATH-102260]

Responsibility: Günter Last, Steffen Winter, Martin Folkers, Daniel Hug

Contained in: [M-MATH-101676] Mathematics 1

ECTS 3,5

Version 1
Course: Mathematics II - Final Exam [T-MATH-102263]

Responsibility: Günter Last, Steffen Winter, Martin Folkers, Daniel Hug

Contained in: [M-MATH-101677] Mathematics 2

ECTS 3.5
Version 1
Course: Mathematics III - Final Exam [T-MATH-102264]

Responsibility: Günter Last, Steffen Winter, Martin Folkers, Daniel Hug

Contained in: [M-MATH-101679] Mathematics 3

ECTS 7

Version 1
Course: Metal Forming [T-MACH-105177]

Responsibility: Florian Herlan

Contained in: [M-MACH-101284] Specialization in Production Engineering

ECTS: 4

Language: deutsch

Version: 1

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<td>Metal Forming</td>
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<td>Florian Herlan</td>
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Die folgenden Informationen stammen aus der Veranstaltung Metal Forming (SS 2016):

The students
- are able to reflect the basics, forming processes, tools, Machines and equipment of metal forming in an integrated and systematic way.
- are capable to illustrate the differences between the forming processes, tools, machines and equipment with concrete examples and are qualified to analyze and assess them in terms of their suitability for the particular application.
- are also able to transfer and apply the acquired knowledge to other metal forming problems.

Content
At the beginning of the lecture the basics of metal forming are briefly introduced. The focus of the lecture is on massive forming (forging, extrusion, rolling) and sheet forming (car body forming, deep drawing, stretch drawing). This includes the systematic treatment of the appropriate metal forming Machines and the corresponding tool technology.

Aspects of tribology, as well as basics in material science and aspects of production planning are also discussed briefly. The plastic theory is presented to the extent necessary in order to present the numerical simulation method and the FEM computation of forming processes or tool design. The lecture will be completed by product samples from the forming technology.

The topics are as follows:
- Introduction and basics
- Hot forming
- Metal forming machines
- Tools
- Metallographic fundamentals
- Plastic theory
- Tribology
- Sheet forming
- Extrusion
- Numerical simulation

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
Lecture Notes
Course: Meteorological Hazards [T-PHYS-101557]

Responsibility: Michael Kunz

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS

Version

1

Conditions
none
Course: Microactuators [T-MACH-101910]

Responsibility: Manfred Kohl

Contained in: [M-MACH-101287] Microsystem Technology

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<td>2142881</td>
<td>Microactuators</td>
<td>Vorlesung (V)</td>
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<td>Manfred Kohl</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Microactuators (SS 2016):

- Knowledge of the actuation principles including pros and cons
- Knowledge of important fabrication technologies
- Explanation of layout and function of the microactuators
- Calculation of important properties (time constants, forces, displacements, etc.)
- Development of a layout based on specifications

Content

- Basic knowledge in the material science of the actuation principles
- Layout and design optimization
- Fabrication technologies
- Selected developments
- Applications

The lecture includes amongst others the following topics:

- Microelectromechanical systems: linear actuators, microrelais, micromotors
- Medical technology and life sciences: Microvalves, micropumps, microfluidic systems
- Microrobotics: Microgrippers, polymer actuators (smart muscle)
- Information technology: Optical switches, mirror systems, read/write heads

Workload

lecture time 1.5 h/week
self preparation: 8.5 h/week

Literature

- Lecture notes
- M. Kohl, Shape Memory Microactuators, M. Kohl, Springer-Verlag Berlin, 2004
Course: Mobile Machines [T-MACH-105168]

Responsibility: Marcus Geimer
Contained in: [M-MACH-101267] Mobile Machines

ECTS 9
Language deutsch
Version 1

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Die folgenden Informationen stammen aus der Veranstaltung Mobile Machines (SS 2016):

After completion of the course the students have knowledge of:

- a wide range of mobile machines
- operation modes and working cycles of important mobile machines
- selected subsystems and components

Content

- Introduction of the required components and machines
- Basics of the structure of the whole system
- Practical insight in the development techniques

Workload

- regular attendance: 42 hours
- self-study: 184 hours
Course: Mobility and Infrastructure [T-BGU-101791]

Responsibility: Ralf Roos
Contained in: [M-BGU-101067] Mobility and Infrastructure

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<td>Peter Vortisch</td>
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</tbody>
</table>

Conditions
none
The student can name the most important methods for model-based calibration of powertrain ECUs. Particularly, he can choose and apply the correct approach for empirical modeling for a given powertrain calibration task (fuel consumption, emissions, air path, driveability, etc.) and type of plant (linear-nonlinear, static-dynamic, etc.). He is capable to solve typical problems of a calibration engineer of automotive OEMs or suppliers.

**Content**

The efforts for the calibration of automotive powertrain ECUs are increasing due to new engine or powertrain technologies and tightening emission laws. From a present view only model-based calibration methods are capable to handle this situation. The lecture presents a selection of practice-proofed model-based calibration methods.

**Workload**

- Regular attendance:
  - Lectures 2 SWS: approx. 22 h
  - Computer exercises 1 SWS: approx. 11 h

- Self study: approx. 87 h

---

**Course: Model Based Application Methods [T-MACH-102199]**

**Responsibility:** Frank Kirschbaum

**Contained in:** [M-MACH-101303] Combustion Engines II

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<tr>
<td>SS 2016</td>
<td>2134139</td>
<td>Model based Application Methods</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Frank Kirschbaum</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Model based Application Methods (SS 2016):

The student can name the most important methods for model-based calibration of powertrain ECUs. Particularly, he can choose and apply the correct approach for empirical modeling for a given powertrain calibration task (fuel consumption, emissions, air path, driveability, etc.) and type of plant (linear-nonlinear, static-dynamic, etc.). He is capable to solve typical problems of a calibration engineer of automotive OEMs or suppliers.
## Course: Modelling and Identification [T-ETIT-100699]

**Responsibility:** Sören Hohmann  
**Contained in:** [M-ETIT-101156] Control Engineering

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<tr>
<td>WS 16/17</td>
<td>23168</td>
<td>Übungen zu 23166 Modellbildung und Identifikation</td>
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<td>Simon Rothfuß</td>
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<td>WS 16/17</td>
<td>23166</td>
<td>Modellbildung und Identifikation</td>
<td>Vorlesung (V)</td>
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<td>Sören Hohmann</td>
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### Conditions

none
Course: Monetary and Financial Policy [T-WIWI-102836]

Responsibility: Joachim Nagel, Berthold Wigger

Contained in: [M-WIWI-101403] Public Finance

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<td>Monetary and Financial Policy</td>
<td>Vorlesung (V)</td>
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<td>Joachim Nagel</td>
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</table>

Learning Control / Examinations

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.

Conditions

None

Recommendations

See german version

Die folgenden Informationen stammen aus der Veranstaltung Monetary and Financial Policy (WS 16/17):

Successful completion of the course will enable students to . . .

- . . . understand the monetary and financial policy before the financial crisis.
- . . . explain the cause of the financial crisis.
- . . . describe and evaluate the monetary policy in crisis mode.
- . . . critically discuss the boundaries of monetary and financial policy.
- . . . discuss the challenges for monetary policy using the example of the European Monetary Union.
- . . . critically evaluate and discuss the topic “financial stability vs. monetary mandate - a contradiction?”.

Content

The current financial crisis changed the operationel implementation of financial policy within the big currency areas. Especially financial policy within the european union faces great challenges because of the dept problems of some union members. Limitations seem to disappears.

The lecture covers this range of topics and explores the question whether the financial crisis changes/will change monetary policy.

Workload

The total workload for this course is approximately 135.0 hours. For further information see German version.
Die folgenden Informationen stammen aus der Veranstaltung Introduction to Public Finance (WS 16/17):

Students are able to:

- critically assess the economic role of the state in a market economy
- explain and discuss key concepts in public finance, including: public goods; economic externalities; and market failure
- explain and critically discuss competing theoretical approaches to public finance, including welfare economics and public choice theory
- explain the theory of bureaucracy according to Weber and critically assess its strengths and weaknesses
- evaluate the incentives inherent in the bureaucratic model, as well as the more recent introduction of market-oriented incentives associated with public-sector reform
- analyze the strategic implications of public decision making

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
Course: Nanotechnology with Clusterbeams [T-MACH-102080]

Responsibility: Jürgen Gspann

Contained in: [M-MACH-101287] Microsystem Technology

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<td>WS 16/17</td>
<td>2143876</td>
<td>Nanotechnology with Clusterbeams</td>
<td>Vorlesung (V)</td>
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<td>Jürgen Gspann</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Nanotechnology with Clusterbeams (WS 16/17):

Nanotechnology is presented on the basis of a technology for nano- and microstructuring by accelerated nanoparticles (clusters), mainly in view of nanomechanics.

**Content**

Nanotechnology in biology
Nanosystemstechnology
Cluster beam generation, ionisation and acceleration; cluster properties
Structure generation using accelerated metal clusters
Structuring via gas cluster impact; reactive accelerated cluster erosion (RACE)
Atomic force microscopy of impact structures; nanotribology
Comparison with femtosecond laser machining (Winter term only)
Simulations; Fullerene synthesis, impact structures, visionary nanomachinery

**Literature**

Foil copies with short commentaries are distributed during the lectures.
Course: Nature-Inspired Optimisation Methods [T-WIWI-102679]

Responsibility: Pradyumn Kumar Shukla

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

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<td>SS 2016</td>
<td>2511106</td>
<td>Nature-Inspired Optimization Methods</td>
<td>Vorlesung (V)</td>
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<td>Pradyumn Kumar Shukla</td>
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</table>

Learning Control / Examinations

The examination will be offered latest until winter term 2017/2018 (repeaters only).
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called “bonus exam”, 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exercises. The bonus exam may be split into several shorter written tests.
The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Nature-Inspired Optimization Methods (SS 2016):

Literature
* E. Bonabeau, M. Dorigo, G. Theraulaz: ‘Swarm Intelligence’. Oxford University Press, 1999
Springer, 2003
**Course: Nonlinear Optimization I [T-WIWI-102724]**

**Responsibility:** Oliver Stein

**Contained in:**
- [M-WIWI-101414] Methodical Foundations of OR
- [M-WIWI-101400] Stochastic Methods and Simulation
- [M-WIWI-101840] Stochastic Methods and Simulation

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**Learning Control / Examinations**
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.

**Conditions**
The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

**Modeled Conditions**
The following conditions must be met:

1. Successful completion of course [T-WIWI-103062] *Prerequisite for Nonlinear Optimization I (Bachelor)* is required before taking this course.

2. Course [T-WIWI-103637] *Nonlinear Optimization I und II* and this course are mutually exclusive.

**Remarks**
Part I and II of the lecture are held consecutively in the same semester.
### Course: Nonlinear Optimization I und II [T-WIWI-103637]

**Responsibility:**

**Contained in:**  [M-WIWI-101414] Methodical Foundations of OR

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<td>2550142</td>
<td>Rechnerübung zu Nichtlineare Optimierung I + II</td>
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<td>Oliver Stein, Robert Mohr</td>
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<td>WS 16/17</td>
<td>2550112</td>
<td>Übungen zu Nichtlineare Optimierung I + II</td>
<td>Übung (Ü)</td>
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<td>Oliver Stein, Robert Mohr</td>
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**Learning Control / Examinations**

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.

**Conditions**

The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

**Modeled Conditions**

The following conditions must be met:

1. Successful completion of course [T-WIWI-103060] Prerequisite for Nonlinear Optimization II (Bachelor) is required before taking this course.
2. Successful completion of course [T-WIWI-103062] Prerequisite for Nonlinear Optimization I (Bachelor) is required before taking this course.
3. Course [T-WIWI-102724] Nonlinear Optimization I and this course are mutually exclusive.
4. Course [T-WIWI-102725] Nonlinear Optimization II and this course are mutually exclusive.

**Remarks**

Part I and II of the lecture are held consecutively in the same semester.
Course: Nonlinear Optimization II [T-WIWI-102725]

Responsibility: Oliver Stein

Contains in: [M-WIWI-101414] Methodical Foundations of OR

ECTS 4,5

Learning Control / Examinations
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.

Conditions
The successful completion of a compulsory prerequisite is mandatory for admission to the exam.

Modeled Conditions
The following conditions must be met:
1. Successful completion of course [T-WIWI-103060] Prerequisite for Nonlinear Optimization II (Bachelor) is required before taking this course.
2. Course [T-WIWI-103637] Nonlinear Optimization I und II and this course are mutually exclusive.

Remarks
Part I and II of the lecture are held consecutively in the same semester.
Course: Novel Actuators and Sensors [T-MACH-102152]

Responsibility: Manfred Kohl, Martin Sommer

Contained in: [M-MACH-101287] Microsystem Technology

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<td>WS 16/17</td>
<td>2141865</td>
<td>Novel actuators and sensors</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Manfred Kohl, Martin Sommer</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Novel actuators and sensors (WS 16/17):

- Knowledge of the principles of actuation and sensing including pros and cons
- Explanation of layout and function of important actuators and sensors
- Calculation of important properties (time constants, forces, displacements, sensitivity, etc.)
- Development of a layout based on specifications

Content

Contents:
- Basic knowledge in the material science of actuator and sensor principles
- Layout and design optimization
- Fabrication technologies
- Selected developments
- Applications

Index: The lecture includes amongst others the following topics:

- Piezo actuators
- Magnetostrictive actuators
- Shape memory actuators
- Electro-/magnetorheological actuators
- Sensors: Concepts, materials, fabrication
- Micromechanical sensors: Pressure, force, inertia sensors
- Temperature sensors
- Micro sensors for bio analytics
- Mechano-magnetic sensors

The lecture addresses students in the fields of mechanical engineering, mechatronics and information technology, materials science and engineering, electrical engineering and economic sciences. A comprehensive introduction is given in the basics and current developments on the macroscopic length scale.

The lecture is core subject of the major course “Actuators and Sensors” of the specialization “Mechatronics and Microsystems Technology” in Mechanical Engineering.

Workload

Work Lecture:

- time of attendance: 1.5 hours/week
- Self-study: 7 hours/week

Work Tutorial:

- time of attendance: 1.5 hours/week
- Self-study: 3.5 hours/week

Literature

- Lecture notes
- Donald J. Leo, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc., 2007
Course: Operative CRM [T-WIWI-102597]

Responsibility: Andreas Geyer-Schulz

Contained in: [M-WIWI-101460] CRM and Service Management
[M-WIWI-101422] Specialization in Customer Relationship Management

ECTS 4.5
Version 1

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length (§4 (2), 1 of the examination regulations) and by submitting written papers as part of the exercise (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).
The course is considered successfully taken, if at least 50 out of 100 points are acquired in the written exam. In this case, all additional points (up to 10) from excersise work will be added.

Conditions
None

Recommendations
The attendance of courses Customer Relationship Management [2540508] and Analytical CRM [2540522] is advised.
Course: Optoelectronic Components [T-ETIT-101907]

Responsibility: Wolfgang Freude

Contained in: [M-MACH-101287] Microsystem Technology

ECTS
Version

Conditions
none
Course: Organic Computing [T-WIWI-102659]

Responsibility: Hartmut Schmeck

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

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<td>Hartmut Schmeck</td>
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<td>SS 2016</td>
<td>2511105</td>
<td>Übungen zu Organic Computing</td>
<td>Übung (Ü)</td>
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<td>Micaela Wünsche, Hartmut Schmeck, Friederike Pfeiffer-Bohnen, Lukas König</td>
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Learning Control / Examinations

The examination will be offered latest until winter term 2016/2017 (repeaters only).
The assessment of this course consists of a written examination (60 min) (following §4(2), 1 SPOs) and of submitting written exercises that recapitulate the content of the course. The exercises include theoretical questions as well as practical programming. For providing a successful solution to all exercises, a bonus will be granted, improving the grade of a passed exam by one grade-step (0.3 or 0.4,) (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015). The course will be offered every second semester (summer term) and exams may be repeated at every ordinary exam date.

Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Organic Computing (SS 2016):

The student acquires the ability to master methods and concepts of Organic Computing and to demonstrate innovation skills regarding the used methods.

Therefore the course aims at the teaching of fundamentals and methods of Organic Computing within the context of its applicability in practice. On the basis of a fundamental understanding of the taught concepts and methods the students should be able to choose the adequate methods and concepts, if necessary further develop them according to the situation and use them properly when facing related problems in their later job. The students should be capable of finding arguments for the chosen solutions and express them to others.

Content

The mission of Organic Computing is to tame complexity in technical systems by providing appropriate degrees of freedom for self-organized behaviour adapting to changing requirements of the execution environment, in particular with respect to human needs. According to this vision an organic computer system should be aware of its own capabilities, the requirements of the environment, and it should be equipped with a number of "self-x" properties allowing for the anticipated adaptiveness and for a reduction in the complexity of system management. These self-x properties are self-organisation, self-configuration, self-optimization, self-healing, self-protection and self-explanation. In spite of these self-x properties, an organic system should be open to external control actions which might be necessary to prevent undesired behaviour.

Workload

The total workload for this course is approximately 150.0 hours. For further information see German version.

Literature

Elective literature:


Further references will be announced in class.
Course: Personnel Policies and Labor Market Institutions [T-WIWI-102908]

Responsibility: Petra Nieken

Contained in: [M-WIWI-101513] Human Resources and Organizations

ECTS: 4,5

Language: deutsch

Version: 1

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<td>2573002</td>
<td>Übungen zu Personalpolitik und Arbeitsmark-</td>
<td>Übung (Ü)</td>
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<td>André Haas, Petra</td>
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Learning Control / Examinations

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

Conditions

None

Recommendations

Completion of module Business Administration is recommended.

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

Die folgenden Informationen stammen aus der Veranstaltung Personnel Policies and Labor Market Institutions (SS 2016):

The student

- understands the process and role of agents in collective wage bargaining.
- analyzes strategic decisions in the context of corporate governance.
- understands the concept of co-determination in Germany.
- challenges statements that evaluate certain personnel politics.

Content

The students acquire knowledge about the process and the strategic aspects of collective bargaining about wages. They analyze selected aspects of corporate governance and co-determination in Germany. The lecture also addresses questions of personnel politics and issue of labor market discrimination. Microeconomic and behavioral approaches as well as empirical data is used and evaluated critically.

Workload

The total workload for this course is approximately 135 hours.

Lecture 32h

Preparation of lecture 52h

Exam preparation 51h

Literature

Course: Photovoltaics [T-ETIT-100724]

Responsibility: N.N.

Contained in: [M-WIWI-101404] Extracurricular Module in Engineering

ECTS 3  SWS 2  Version 1

Conditions
none
Course: Physical Basics of Laser Technology [T-MACH-102102]

Responsibility: Johannes Schneider
Contained in: [M-MACH-101262] Emphasis Materials Science

ECTS 5  Version 1

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<td>WS 16/17</td>
<td>2181612</td>
<td>Physical basics of laser technology</td>
<td>Vorlesung (VÜ) / Übung 3</td>
<td>Johannes Schneider</td>
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</table>

Learning Control / Examinations
oral examination (30 min)

no tools or reference materials

Conditions
Basic knowledge of physics, chemistry and material science is assumed.
It is not possible, to combine this lecture with the lecture Laser Application in Automotive Engineering [2182642]

Die folgenden Informationen stammen aus der Veranstaltung Physical basics of laser technology (WS 16/17):

The student

- can explain the principles of light generation, the conditions for light amplification as well as the basic structure and function of different laser sources.
- can describe the influence of laser, material and process parameters for the most important methods of laser-based materials processing and choose laser sources suitable for specific applications.
- can illustrate the possible applications of laser sources in measurement and medicine technology
- can explain the requirements for safe handling of laser radiation and for the design of safe laser systems.

Content
Based on the description of the physical basics about the formation and the properties of laser light the lecture goes through the different types of laser beam sources used in industry these days. The lecture focuses on the usage of lasers especially in materials engineering. Other areas like measurement technology or medical applications are also mentioned. An excursion to the laser laboratory of the Institute for Applied Materials (IAM) will be offered.

- physical basics of laser technology
- laser beam sources (solid state, diode, gas, liquid and other lasers)
- beam properties, guiding and shaping
- lasers in materials processing
- lasers in measurement technology
- lasers for medical applications
- safety aspects

The lecture is complemented by a tutorial.

Workload
regular attendance: 33,5 hours
self-study: 146,5 hours

Literature
Course: Physics for Engineers [T-MACH-100530]

Responsibility: Alexander Nesterov-Müller, Peter Gumbsch

Contained in: [M-MACH-101287] Microsystem Technology

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Events

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<tr>
<td>SS 2016</td>
<td>2142890</td>
<td>Physics for Engineers</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Tobias Christoph Förtsch, Daniel Weygand, Alexander Nesterov-Müller, Peter Gumbsch</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Physics for Engineers (SS 2016):

The student

- has the basic understanding of the physical foundations to explain the relationship between the quantum mechanical principles and the optical as well as electrical properties of materials
- can describe the fundamental experiments, which allow the illustration of these principles

Content

1) Foundations of solid state physics
   - Wave particle dualism
   - Tunnelling
   - Schrödinger equation
   - H-atom

2) Electrical conductivity of solids
   - solid state: periodic potentials
   - Pauli Principle
   - band structure
   - metals, semiconductors and isolators
   - p-n junction / diode

3) Optics
   - quantum mechanical principles of the laser
   - linear optics
   - non-linear optics

Workload

regular attendance: 22,5 hours (lecture) and 22,5 hours (excerises 2142891)
self-study: 97,5 hours and 49 hours (excerises 2142891)

Literature

- Tipler und Mosca: Physik für Wissenschaftler und Ingenieure, Elsevier, 2004
Course: PLM for Product Development in Mechatronics [T-MACH-102181]

Responsibility: Martin Eigner

Contained in: [M-MACH-101270] Product Lifecycle Management

ECTS 4

Language deutsch

Version 1

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<td>SS 2016</td>
<td>2122376</td>
<td>PLM for product development in mechatronics</td>
<td>Vorlesung (V)</td>
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<td>Martin Eigner</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung PLM for product development in mechatronics (SS 2016):

Students have a basic overview about product data management and product lifecycle management.
Students know components and core functions of PLM solutions
Students can describe trends in research and practice in the environment of PLM

Workload
The total workload for this course is approximately 120 hours. For further information see German version.
Die folgenden Informationen stammen aus der Veranstaltung PLM-CAD Workshop (WS 16/17):

Ziel des Workshops ist es, den Nutzen der kollaborativen Produktentwicklung mit PLM aufzuzeigen und deren Mehrwert gegenüber einer klassischen CAD- Entwicklung hervorzuheben. Den Studierenden wird im Einzelnen vermittelt, wie durch PLM produktschreibende Daten, wie z. B. Stücklisten und Zeichnungen, ganzheitlich und transparent verwaltet werden, sowie Abläufe in der Produktentwicklung automatisiert gesteuert werden können.

Content
Im Rahmen des Workshops wird eine Produktentwicklung als Projektauftrag innerhalb des Produktlebenszyklus durch den Einsatz moderner PLM/PDM- und CAD- Systeme abgewickelt.
Course: Polymer Engineering I [T-MACH-102137]

Responsibility: Peter Elsner

Contained in: [M-MACH-101262] Emphasis Materials Science

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<td>WS 16/17</td>
<td>2173590</td>
<td>Polymer Engineering I</td>
<td>Vorlesung (V)</td>
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<td>Kay Weidenmann, Peter Elsner</td>
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</tbody>
</table>

Conditions
none

Die folgenden Informationen stammen aus der Veranstaltung Polymer Engineering I (WS 16/17):

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, to equip the students with knowledge and technical skills, and to use the material “polymer” meeting its requirements in an economical and ecological way.

The students
- are able to describe and classify polymers based on the fundamental synthesis processing techniques
- can find practical applications for state-of-the-art polymers and manufacturing technologies
- are able to apply the processing techniques, the application of polymers and polymer composites regarding to the basic principles of material science
- can describe the special mechanical, chemical and electrical properties of polymers and correlate these properties to the chemical bindings.
- can define application areas and the limitation in the use of polymers

Content
1. Economical aspects of polymers
2. Introduction of mechanical, chemical end electrical properties
3. Processing of polymers (introduction)
4. Material science of polymers
5. Synthesis

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
Recommended literature and selected official lecture notes are provided in the lecture
Course: Polymerengineering II [T-MACH-102138]

Responsibility: Peter Elsner

Contained in: [M-MACH-101262] Emphasis Materials Science

ECTS 4 Language deutsch Version 1

Events

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<td>Polymer Engineering II</td>
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<td>Kay Weidenmann, Peter Elsner</td>
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</table>

Learning Control / Examinations

Oral examination

Duration: 20-30 Minutes

Conditions none

Recommendations

Knowledge in Polymerengineering I

Die folgenden Informationen stammen aus der Veranstaltung Polymer Engineering II (SS 2016):

The field of Polymer Engineering includes synthesis, material science, processing, construction, design, tool engineering, production technology, surface engineering and recycling. The aim is, that the students gather knowledge and technical skills to use the material “polymer” meeting its requirements in an economical and ecological way.

The students

- can describe and classify different processing techniques
- and can exemplify mould design principles based on technical parts
- know about practical applications and processing of polymer parts
- are able to design polymer parts according to given restrictions
- can choose appropriate polymers based on the technical requirements
- can decide how to use polymers regarding the production, economical and ecological requirements

Content

1. Processing of polymers
2. Properties of polymer components
   Based on practical examples and components
   2.1 Selection of material
   2.2 Component design
   2.3 Tool engineering
   2.4 Production technology
   2.5 Surface engineering
   2.6 Sustainability, recycling

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

Recommended literature and selected official lecture notes are provided in the lecture
Course: Power Generation [T-ETIT-101924]

Responsibility: Bernd Hoferer

Contained in: [M-ETIT-101165] Energy Generation and Network Components
[M-WIWI-101404] Extracurricular Module in Engineering

ECTS 3  SWS 2  Version 1

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<td>23356</td>
<td>Erzeugung elektrischer Energie</td>
<td>Vorlesung (V)</td>
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<td>Bernd Hoferer</td>
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Conditions
none
Course: Power Network [T-ETIT-100830]

Responsibility: Thomas Leibfried

Contained in: [M-ETIT-102379] Power Network

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<td>23373</td>
<td>Übungen zu 23371 Elektrische Energienetze</td>
<td>Übung (Ü)</td>
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<td>Yannick Rink</td>
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<tr>
<td>WS 16/17</td>
<td>23371</td>
<td>Elektrische Energienetze</td>
<td>Vorlesung (V)</td>
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<td>Thomas Leibfried</td>
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</table>
Course: Practical Seminar Digital Services [T-WIWI-105711]

Responsibility: Christof Weinhardt, Rudi Studer, Stefan Nickel, Wolf Fichtner, Alexander Mädche, York Sure-Vetter, Gerhard Satzger


Learning Control / Examinations
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).

Conditions
None

Recommendations
None

Remarks
The current range of seminar topics is announced on the KSRI website www.ksri.kit.edu.
Course: Practical Training in Basics of Microsystem Technology [T-MACH-102164]

Responsibility: Arndt Last

Contained in: [M-MACH-101287] Microsystem Technology

ECTS 3 Language deutsch Version 1

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<td>2143875</td>
<td>Introduction to Microsystem Technology - Praktikum (P)</td>
<td>2 Arndt Last</td>
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<tr>
<td>WS 16/17</td>
<td>2143875</td>
<td>Introduction to Microsystem Technology - Practical Course</td>
<td>2 Arndt Last</td>
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Die folgenden Informationen stammen aus der Veranstaltung Introduction to Microsystem Technology - Practical Course (WS 16/17):

- Deepening of the contents of the lecture MST I resp. II
- Understanding the technological processes in the micro system technology
- Experience in lab-work at real workplaces where normally research is carried out

Content
In the practical training includes nine experiments:
1. Hot embossing of plastics micro structures
2. Micro electroforming
4. UV-lithography
5. Optical waveguides
6. Capillary electrophoresis on a chip
7. SAW gas sensor
8. Metrology
9. Atomic force microscopy

Each student takes part in only five experiments.

The experiments are carried out at real workstations at the IMT and coached by IMT-staff.

Workload
Time of attendance: 21 h + 2 h exam
Privat studies: 5 h preparing experiments + 10 h preparing the exam

Literature
Menz, W., Mohr, J.: Mikrosystemtechnik für Ingenieure, VCH-Verlag, Weinheim, 1997
Unterlagen zum Praktikum zur Vorlesung ‘Grundlagen der Mikrosystemtechnik’
Course: Prerequisite for Facility Location and Strategic Supply Chain Management [T-WIWI-103061]

Responsibility: Stefan Nickel

Contained in:
[MIWI-101421] Supply Chain Management
[MIWI-101414] Methodical Foundations of OR

ECTS
Version 1

Learning Control / Examinations
Proof of successful participation in the practical lessons.

Conditions
None
Course: Prerequisite for Nonlinear Optimization I (Bachelor) [T-WIWI-103062]

Responsibility:

Contained in:
- [M-WIWI-101414] Methodical Foundations of OR
- [M-WIWI-101400] Stochastic Methods and Simulation
- [M-WIWI-101840] Stochastic Methods and Simulation

Learning Control / Examinations
See German version

Conditions
None
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<th><strong>Course:</strong> Prerequisite for Nonlinear Optimization II (Bachelor) [T-WWI-103060]</th>
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<tr>
<td><strong>Responsibility:</strong> Oliver Stein</td>
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<tr>
<td><strong>Contained in:</strong> [M-WWI-101414] Methodical Foundations of OR</td>
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</table>
Course: Prerequisite for Tactical and Operational Supply Chain Management [T-WIWI-105940]

Responsibility: Stefan Nickel

Contained in:
- [M-WIWI-101421] Supply Chain Management
- [M-WIWI-101400] Stochastic Methods and Simulation
- [M-WIWI-101840] Stochastic Methods and Simulation

Learning Control / Examinations
Proof of successful participation in the practical lessons.

Conditions
None

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
**Course: Principles of Insurance Management [T-WIWI-102603]**

**Responsibility:** Ute Werner  
**Contained in:** [M-WIWI-101436] Risk and Insurance Management  

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<td>2530055</td>
<td>Principles of Insurance Management</td>
<td>Vorlesung (V)</td>
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<td>Ute Werner</td>
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**Learning Control / Examinations**

The assessment consists of oral presentations (incl. papers) within the lecture (according to Section 4 (2), 3 of the examination regulation) and a final oral exam (according to Section 4 (2), 2 of the examination regulation). The overall grade consists of the assessment of the oral presentations incl. papers (50 percent) and the assessment of the oral exam (50 percent).

**Conditions**

None

**Recommendations**

None

*Die folgenden Informationen stammen aus der Veranstaltung Principles of Insurance Management (SS 2016):*  
See German version.

**Workload**

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

**Literature**

- U. Werner. Einführung in die Versicherungsbetriebslehre. Skript zur Vorlesung.

**Elective literature:**

Will be announced during the lecture.
Course: Probabilistic Machine Learning for Finance and Data Science [T-WIWI-105712]

Responsibility: Maxim Ulrich
Contained in: [M-WIWI-102753] Machine Learning for Finance and Data Science

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<td>Maxim Ulrich</td>
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Learning Control / Examinations
See description of the respective module

Conditions
See description of the respective module

Remarks
New course starting summer term 2016 and will be taught in English.
Course: Problem Solving, Communication and Leadership [T-WIWI-102871]

Responsibility: Hagen Lindstädt

Contained in: [M-WIWI-101513] Human Resources and Organizations
[M-WIWI-101425] Strategy and Organization

ECTS 2
Language deutsch
Version 1

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<td>SS 2016</td>
<td>2577910</td>
<td>Problem solving, communication and leadership Vorlesung (V)</td>
<td>1</td>
<td>Kerstin Fehre, Hagen Lindstädt</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Problem solving, communication and leadership (SS 2016):

After passing this course students are able to

- structure problem solving processes.
- apply the principles of focused communication based on charts and presentations.
- understand leadership in the context of situation and personality.

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: Procedures of Remote Sensing [T-BGU-103542]

Responsibility: Uwe Weidner

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS: 3  Version: 1

Modeled Conditions
The following conditions must be met:
- Successful completion of course [T-BGU-101638] Procedures of Remote Sensing, Prerequisite is required before taking this course.
## Course: Procedures of Remote Sensing, Prerequisite [T-BGU-101638]

**Responsibility:** Uwe Weidner  
**Contained in:**  
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1  
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

### ECTS 1  
Version 1

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<td>SS 2016</td>
<td>6020266</td>
<td>Übungen zu Fernerkundungsverfahren</td>
<td>Übung (Ü)</td>
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<td>Uwe Weidner</td>
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### Course: Process fundamentals by the example of food production [T-CIWVT-106058]

**Responsibility:** Volker Gaukel  
**Contained in:** [M-WIWI-101839] Additional Fundamentals of Engineering

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#### Events

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<td>WS 16/17</td>
<td>22213</td>
<td>Verfahrenstechnische Grundlagen am Beispiel der Lebensmittelverarbeitung (für LmCh, WiWi)</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Volker Gaukel</td>
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#### Conditions

none
Course: Product Lifecycle Management [T-MACH-105147]

Responsibility: Jivka Ovtcharova

Contained in: [M-MACH-101270] Product Lifecycle Management

ECTS: 6
Language: deutsch
Version: 1

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<td>Product Lifecycle Management</td>
<td>Vorlesung (V)</td>
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<td>Jivka Ovtcharova</td>
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Die folgenden Informationen stammen aus der Veranstaltung Product Lifecycle Management (WS 16/17):

The students can:

- clarify the management concept of PLM, its objectives and highlight the economic benefits of the PLM concept.
- illustrate the need for an integrated and cross-departmental business process - from planning, portfolio construction and return of customer information, from the use phase to maintenance and recycling of products.
- reason the processes and functions needed to support the entire product life cycle and discuss the main operating software systems (PDM, ERP, SCM, CRM) and their functions for supporting PLM.
- argue a method to successfully introduce the concept of Management PLM in companies.

Content

Product Lifecycle Management (PLM) is an approach to the holistic and cross-company management and control of all product-related processes and data throughout the life cycle along the extended supply chain - from design and production to sales, to the dismantling and recycling.

Product Lifecycle Management is a comprehensive approach for effective and efficient design of the product life cycle. Based on all product information, which comes up across the entire value chain and across multiple partners, processes, methods and tools are made available to provide the right information at the right time, quality and the right place.

The course covers:

- A consistent description of all business processes that occur during the product life cycle (development, production, sales, dismantling, ...)
- the presentation of methods for the performance of the PLM business processes,
- explaining the most important corporate information systems to support the life cycle (PDM, ERP, SCM, CRM systems) to sample the software manufacturer SAP

Workload

regular attendance: 42 hours
self-study: 128 hours

Literature

Lecture slides.


Course: Production and Logistics Controlling [T-WIWI-103091]

Responsibility: Helmut Wlcek

Contained in: [M-MACH-101269] Introduction to Technical Logistics

ECTS: 3
Version: 1

Learning Control / Examinations
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Conditions
None
Course: Production Economics and Sustainability [T-WIWI-102820]

Responsibility: Magnus Fröhling

Contained in: [M-WIWI-101437] Industrial Production I

ECTS | Language | Version
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3,5 | deutsch | 1

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<td>2581960</td>
<td>Production Economics and Sustainability</td>
<td>Vorlesung (V)</td>
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<td>Jérémy Rimbon</td>
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Learning Control / Examinations

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.

Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Production Economics and Sustainability (WS 16/17):

Students shall be aware of issues concerning industrial production and sustainability and shall apply strategies to resolve these issues.

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, Ecoprofit), eco-controlling

Workload

Total effort required will account for approximately 105h (3.5 credits).

Literature

will be announced in the course
Course: Production Technology and Management in Automotive Industry [T-MACH-102189]

Responsibility: Volker Michael Stauch

Contained in: [M-MACH-101284] Specialization in Production Engineering

ECTS: 4
Language: deutsch
Version: 1

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<tr>
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<td>2149001</td>
<td>Production Technology and Management in Automotive</td>
<td>Vorlesung (VU) /</td>
<td></td>
<td>Volker Michael Stauch</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Production Technology and Management in Automotive (WS 16/17):

The students . . .

- are capable to specify the current challenges in automotive industry and to explain approaches to solve them.
- are able to classify the main parts of an automotive plant and its key elements (production facilities).
- are qualified to identify interlinkages between development processes and production systems (such as lean production).
- have the ability to classify modern concepts of logistics and tasks in management and design of value added networks.
- are enabled to explain the importance of an integrated quality management in product development and production as well as related methods.
- are able to characterize methodical approaches of analytical assessment and optimization of production planning tasks.

Content

The lecture deals with the technical and organizational aspects of automotive production. The course starts with an introduction to the automotive industry, current trends in vehicle technology and integrated product development. A selection of manufacturing processes are subjects of the second lecture block. Experiences of the applications of the Mercedes Production System in production, logistics and maintenance are the subject of the third event. During the last block approaches to quality management, global networks and current analytical planning methods in research are discussed. The course is strongly oriented towards the practice and is provided with many current examples. Mr. Stauch was Head of Powertrain Production Mercedes Benz Cars and plant manager Untertürkheim until 2010.

The following topics will be covered:

- Introduction to Automotive Industry and Technology
- Basics of Product Development
- Selected Automotive Manufacturing Technologies
- Automotive Production Systems
- Logistics
- Quality Assurance
- Global Networks
- Analytical Approaches of Production Planning

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

Lecture Slides
Course: Project in Applied Remote Sensing [T-BGU-101814]

Responsibility: Stefan Hinz

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

ECTS

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<td>6020267</td>
<td>Projektübung angewandte Fernerkundung</td>
<td>Übung (Ü)</td>
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<td>Assistenten, Stefan Hinz</td>
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Modeled Conditions

The following conditions must be met:

- Successful completion of course [T-BGU-101638] Procedures of Remote Sensing, Prerequisite is required before taking this course.
Course: Project Management [T-BGU-101675]

Responsibility: Shervin Haghsheno

Contained in: [M-BGU-101004] Fundamentals of construction

ECTS: 3
Version: 1

Conditions: none
Course: Project Workshop: Automotive Engineering [T-MACH-102156]

Responsibility: Martin Gießler, Frank Gauterin, Michael Frey

Contained in:
- [M-MACH-101266] Automotive Engineering
- [M-MACH-101264] Handling Characteristics of Motor Vehicles
- [M-MACH-101265] Vehicle Development

ECTS 4,5 Language deutsch Version 1

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<td>Project Workshop: Automotive</td>
<td>Vorlesung (V)</td>
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<td>Vorlesung (V)</td>
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<td>Martin Gießler, Frank Gauterin, Michael Frey</td>
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Die folgenden Informationen stammen aus der Veranstaltung Project Workshop: Automotive Engineering (WS 16/17):

The students are familiar with typical industrial development processes and working style. They are able to apply knowledge gained at the university to a practical task. They are able to analyze and to judge complex relations. They are ready to work self-dependently, to apply different development methods and to work on approaches to solve a problem, to develop practice-oriented products or processes.

Content
During the Project Workshop Automotive Engineering a team of six persons will work on a task given by an German industrial partner using the instruments of project management. The task is relevant for the actual business and the results are intended to be industrialized after the completion of the project workshop.

The team will generate approaches in its own responsibility and will develop solutions for practical application. Coaching will be supplied by both, company and institute.

At the beginning in a start-up meeting goals and structure of the project will be specified. During the project workshop there will be weekly team meetings. Also a milestone meeting will be held together with persons from the industrial company. In a final presentation the project results will be presented to the company management and to institute representatives.

Workload
regular attendance: 49 hours
self-study: 131 hours

Literature

The scripts will be supplied in the start-up meeting.
<table>
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<tr>
<th>Course: Projectseminar [T-GEISTSOZ-101958]</th>
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<tr>
<td><strong>Responsibility:</strong> Gerd Nollmann</td>
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<tr>
<td><strong>Contained in:</strong> [M-GEISTSOZ-101167] Sociology/Empirical Social Research</td>
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<tbody>
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</table>
Course: Public Law I - Basic Principles [T-INFO-101963]

Responsibility: Matthias Bäcker

Contained in: [M-INFO-101187] Elective Module Law

ECTS 3  SWS 4  Version 1
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<td>Contained in: [M-INFO-101187] Elective Module Law</td>
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</table>
Course: Public Revenues [T-WIWI-102739]

Responsibility: Berthold Wigger

Contained in:  
- [M-WIWI-101499] Applied Microeconomics
- [M-WIWI-101668] Economic Policy I
- [M-WIWI-101403] Public Finance

Events

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Learning Control / Examinations

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.

Conditions

None

Recommendations

Basic knowledge of Public Finance is required.

Die folgenden Informationen stammen aus der Veranstaltung Public Revenues (SS 2016):

See German version.

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-incurred.

Workload

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

Literature

Elective literature:

Course: Quality Management [T-MACH-102107]

Responsibility: Gisela Lanza

Contained in: [M-WIWI-101404] Extracurricular Module in Engineering
[M-MACH-101284] Specialization in Production Engineering

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Events

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<td>2149667</td>
<td>Quality Management</td>
<td>Vorlesung (V)</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Quality Management (WS 16/17):

The students . . .

- are capable to comment on the content covered by the lecture.
- are capable of substantially quality philosophies.
- are able to apply the QM tools and methods they have learned about in the lecture to new problems from the context of the lecture.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques they have learned about in the lecture for a specific problem.

Content

Based on the quality philosophies Total Quality Management (TQM) and Six Sigma, the lecture deals with the requirements of modern quality management. Within this context, the process concept of a modern enterprise and the process-specific fields of application of quality assurance methods are presented. The lecture covers the current state of the art in preventive and non-preventive quality management methods in addition to manufacturing metrology, statistical methods and service-related quality management. The content is completed with the presentation of certification possibilities and legal quality aspects.

Main topics of the lecture:

- The term “quality”
- Total Quality Management (TQM) and Six Sigma
- Universal methods and tools
- QM during early product stages – product definition
- QM during product development and in procurement
- QM in production – manufacturing metrology
- QM in production – statistical methods
- QM in service
- Quality management systems
- Legal aspects of QM

Workload

regular attendance: 21 hours
self-study: 99 hours

Literature

Lecture Notes
Course: Rail System Technology [T-MACH-102143]

Responsibility: Peter Gratzfeld

Contained in: [M-MACH-101274] Rail System Technology

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<td>Rail System Technology</td>
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<tr>
<td>SS 2016</td>
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<td>Projektmanagement im Schienenfahrzeugbau</td>
<td>Vorlesung (V)</td>
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<tr>
<td>WS 16/17</td>
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<td>Rail Vehicle Technology</td>
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<td>WS 16/17</td>
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<td>Project Management in Rail Industry</td>
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</table>

Die folgenden Informationen stammen aus der Veranstaltung Rail System Technology (SS 2016):

The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system. They can assess the suitability of existing elements in the overall system. They deduct the fundamental requirements for rail vehicles out of it.

Content

Introduction: railway as system, history, networks, traffic development, economic impact
Vehicle dynamics: driving resistance, tractive effort diagram, load cycles
Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance
Train protection: succession of trains, guideway
Traction power supply: power networks, power distribution, substations
Vehicles: definitions, compositions
Environmental aspect: energy consumption, traffic area, noise

Workload

Regular attendance: 21 hours
Self-study: 21 hours
Exam and preparation: 78 hours

Literature

A bibliography is available for download (Ilias-platform).

Die folgenden Informationen stammen aus der Veranstaltung Rail Vehicle Technology (SS 2016):

The students learn about advantages and disadvantages of different types of traction drives and judge which one fits best for each application. They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems. They know about the basics of running dynamics and bogies. They define suitable vehicle concepts based on requirements for modern rail vehicles.

Content

Vehicle system technology: structure and main systems of rail vehicles
Drives: Electric and non-electric traction drives
Brakes: Tasks, basics, principles, brake control
Bogies: forces, running gears, axle configuration
Vehicle concepts: trams, metros, regional trains, double deck coaches, locomotives
Examples of existing rail vehicles were discussed.

Workload

Regular attendance: 21 hours
Self-study: 21 hours
Exam and preparation: 78 hours
The students learn the basic of project management.
They learn about the roles of project manager and project core team.
They understand the project phases and know about processes and tools.
They understand the governance process behind.

**Content**

Rail vehicles are capital-intensive goods which are manufactured in small series (like aircraft). The work to done at industry and customers is organized in "projects". This is completely different to the way of working in large-scale production (like car industry). Everybody working in this type of business is part of a project and should be aware of the typical processes.

The lecturer provides a comprehensive overview about modern project management for small series of capital-intensive goods. The content is not only valid for rail vehicles but also other areas.

The following topics will be discussed:

- Introduction: definition of project and project management
- Project management system: project phases, main processes and supporting processes, governance
- Organization: organizational structure within a company, project organization, roles in a project organization
- Main processes: project start, project plan, work brake down structure, detailed project schedule, risk and opportunity management, change management, project closure
- Governance

**Workload**

- Regular attendance: 21 hours
- Self-study: 21 hours
- Exam and preparation: 78 hours

**Literature**

A bibliography is available for download (Ilias-platform).
Course: Real Estate Management I [T-WIWI-102744]

Responsibility: Thomas Lützkendorf

Contained in: [M-WIWI-101466] Real Estate Management

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<td>Vorlesung (V)</td>
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</table>

Learning Control / Examinations
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.

Conditions
None

Remarks
The course is replenished by excursions and guest lectures by practitioners out of the real estate business.

Die folgenden Informationen stammen aus der Veranstaltung Real Estate Management I (WS 16/17):

The student
- has a basic understanding of the specific characteristics of real estate and real estate markets
- is able to transfer and apply in-depth knowledge in the field of business administration to construction and real estate
- is able to analyze, evaluate or to meet decisions in the life cycle of real estate

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 recesses the contents of the course by means of practical examples and, in addition to that, goes into the possible use of software tools.

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

Literature
Elective literature:
Course: Real Estate Management II [T-WIWI-102745]

Responsibility: Thomas Lützkendorf

Contained in: [M-WIWI-101466] Real Estate Management

ECTS 4,5 Language deutsch Version 1

Events

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<td>2585401</td>
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Learning Control / Examinations
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.

Conditions
None

Recommendations
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)

Remarks
The course is replenished by excursions and guest lectures by practitioners out of the real estate business.

Die folgenden Informationen stammen aus der Veranstaltung Real Estate Management II (SS 2016):

The student
- has an in-depth knowledge on the economic classification and significance of the real estate industry
- has a critical understanding of essential theories, methods and instruments of the real estate industry
- is able to analyze and evaluate activity areas and functions in real estate companies as well as to prepare or to take decisions

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.

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: Remote Sensing, exam [T-BGU-101636]

Responsibility: Stefan Hinz

Contents: Introduction to Natural Hazards and Risk Analysis 1

Introduction to Natural Hazards and Risk Analysis 2

ECTS: 4
Version: 1

Events

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Modeled Conditions
The following conditions must be met:

1. Successful completion of course [T-BGU-101637] Systems of Remote Sensing, Prerequisite is required before taking this course.
2. Successful completion of course [T-BGU-101638] Procedures of Remote Sensing, Prerequisite is required before taking this course.

Recommendations
None

Responsibility: Russell McKenna

Contained in: [M-WIWI-101464] Energy Economics

ECTS: 3.5
Language: englisch
Version: 1

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</table>

Learning Control / Examinations
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Conditions
None


The student:

- understands the motivation and the global context of renewable energy resources.
- gains detailed knowledge about the different renewable resources and technologies as well as their potentials.
- understands the systemic context and interactions resulting from the increased share of renewable power generation.
- understands the important economic aspects of renewable energies, including electricity generation costs, political promotion and marketing of renewable electricity.
- is able to characterize and where required calculate these technologies.

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:

Die folgenden Informationen stammen aus der Veranstaltung Requirements Analysis and Requirements Management (WS 16/17):

The students have a full understanding of the foundations of the analysis and management of requirements as part of the development process of software and systems. They know the main terminology and approaches of this topic, and are able to express requirements themselves using different description methods.

Content
The analysis and management of requirements is a central task in the development of software and systems, addressing the border between the application discipline and computer science. The adequate performance of this task has a decisive influence on the whether or not a development project will be successful. The lecture provides an introduction to this topic, using the syllabus for the “Certified Professional for Requirements Engineering” (CPRE) as a guideline.

Lecture structure:
1. Introduction and overview, motivation
2. Identifying requirements
3. Documenting requirements (in natural language or using a modelling language such as UML)
4. Verification and validation of requirements
5. Management of requirements
6. Tool support

Workload
Workload: 120h overall,
Lecture 30h
Review and preparation of lectures 60h
Exam preparation 29h
Exam 1h

Literature
Literature will be given in the lecture.
Course: Selected Applications of Technical Logistics [T-MACH-102160]

Responsibility: Vladimir Madzharov, Martin Mittwollen

Contained in: [M-MACH-101269] Introduction to Technical Logistics

ECTS: 4
Language: deutsch
Version: 1

Events

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<td>3</td>
<td>Martin Mittwollen</td>
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Conditions

none

Die folgenden Informationen stammen aus der Veranstaltung Selected Applications of Technical Logistics (SS 2016):

Students are able to:

- Model the dynamic behaviour of material handling systems and based on this calculate the dynamical behaviour and
- Transfer this approach autonomous to further, different material handling installations and
- Discuss the knowledge with subject related persons.

Content

design and dimension of machines from intralogistics // static and dynamic behaviour // operation properties and specifics // visit of real intralogistic system

Inside practical lectures: sample applications and calculations in addition to the lectures

Workload

presence: 31.5h
rework: 148.5h

Literature

Recommendations during lessons
Course: Selected Applications of Technical Logistics and Project [T-MACH-102161]

Responsibility: Vladimir Madzharov, Martin Mittwollen

Contained in: [M-MACH-101269] Introduction to Technical Logistics

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Events

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<td>SS 2016</td>
<td>2118088</td>
<td>Selected Applications of Technical Logistics and Seminar (S) Project</td>
<td>4</td>
<td>Martin Mittwollen</td>
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Die folgenden Informationen stammen aus der Veranstaltung Selected Applications of Technical Logistics and Project (SS 2016):

Students are able to:

- Model the dynamic behaviour of material handling systems and based on this calculate the dynamical behaviour and
- Transfer this approach autonomous to further, different material handling installations,
- Discuss the knowledge with subject related persons and
- Judge about systems in place and justify it in front of subject related persons.

Content

design and dimension of machines from intralogistics // static and dynamic behaviour // operation properties and specifics // visit of real intralogistic system // self manufactured project report

Inside practical lectures: sample applications and calculations in addition to the lectures

Self manufacturing of a project report to recesses the topic.

Workload

presence: 42h
rework: 198h

Literature

Recommendations during lessons
**Course:** Selected Topics on Optics and Microoptics for Mechanical Engineers [T-MACH-102165]

**Responsibility:** Timo Mappes  
**Contained in:** [M-MACH-101287] Microsystem Technology

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<td>2143892</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers</td>
<td>Block-Vorlesung (BV)</td>
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<td>Timo Mappes</td>
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Die folgenden Informationen stammen aus der Veranstaltung Selected Topics on Optics and Microoptics for Mechanical Engineers (SS 2016):

Die Vorlesung “Ausgewählte Kapitel der Optik und Mikrooptik für Maschinenbauer” verfolgt folgende Lernziele:

(a) Die Studierenden können den Aufbau eines optischen Instruments beschreiben und erklären.
(b) Die Studierenden können Fertigungsverfahren (mikro)optischer Bauteile gegeneinander abwägen und bewerten sowie Ansätze zu neuen Fertigungsprozessen entwickeln.
(c) Die Studierenden können die Ursachen von Aberrationen beschreiben und unterschiedliche optische Effekte in die technische Nutzung übertragen.
(d) Die Studierenden können Kontrastverfahren zur optimalen Sichtbarmachung mikroskopischer Strukturen im Auf- und Durchlicht problemorientiert auswählen.
(e) Die Studierenden wenden das Wissen um den Aufbau und die Fertigungsverfahren eines optischen Instruments im Design eines Instruments mit ungewöhnlichen Anforderungen konkret an und skizzieren die Vor- und Nachteile der entwickelten Konstruktionssätze.
(f) Die Studierenden können die erlernten Techniken (Auslegung eines optischen Strahlengangs, Funktionsweisen einfacher mikroskopischer Kontrastverfahren und zudem des Projektmanagements) in einem der Aufgabe entsprechenden Format präsentieren.

**Content**


**Workload**

Präsenzzeit: 26 Stunden  
Selbststudium: 94 Stunden

**Literature**

(a) Hecht Eugene: Optik; 5., überarb. Aufl.; Oldenbourg Verlag, München und Wien, 2009
(b) Folien der Vorlesung als *.pdf
Course: Semantic Web Technologies [T-WIWI-102874]

Responsibility: Rudi Studer, Andreas Harth

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

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Version

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englisch
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<td>2511311</td>
<td>Exercises to Semantic Web Technologies</td>
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<td>Rudi Studer, Maribel Acosta Deibe, Andreas Harth, York Sure-Vetter</td>
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<td>SS 2016</td>
<td>2511310</td>
<td>Semantic Web Technologies</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Rudi Studer, Andreas Harth, York Sure-Vetter</td>
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Learning Control / Examinations
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.

Conditions
None

Recommendations
Lectures on Informatics of the Bachelor on Information Management (Semester 1-4) or equivalent are required.

Die folgenden Informationen stammen aus der Veranstaltung Semantic Web Technologies (SS 2016):
The student
- understands the motivation and foundational ideas behind Semantic Web and Linked Data technologies, and is able to analyse and realise systems
- demonstrates basic competency in the areas of data and system integration on the web
- masters advanced knowledge representation scenarios involving ontologies

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
  http://www.w3.org/TR/webarch/
Course: Seminar in Business Administration (Bachelor) [T-WIWI-103486]

Responsibility:
Martin Klarmann, Marliese Uhrig-Homburg, Christof Weinhardt, Andreas Geyer-Schulz, Ju-Young Kim, Hagen Lindstädt, Thomas Lützkendorf, Stefan Nickel, Marcus Wouters, Petra Nieken, Wolf Fichtner, Hansjörg Fromm, Ute Werner, David Lorenz, Gerhard Satzger, Frank Schultmann, Bruno Neibecker, Orestis Terzidis, Marion Weissenberger-Eibl, Martin Ruckes

Contained in: [M-WIWI-101816] Seminar Module

ECTS 3  Language englisch/deutsch  Version 1

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<td>SS 2016</td>
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<td>Seminar Management Accounting</td>
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<td>Frank Stadtherr, Michael Pelz</td>
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<td>SS 2016</td>
<td>2571180</td>
<td>Seminar in Marketing und Vertrieb (Bachelor)</td>
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<td>SS 2016</td>
<td>2579905</td>
<td>Special Topics in Management Accounting</td>
<td>Seminar (S)</td>
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<td>Ana Mickovic</td>
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<td>WS 16/17</td>
<td>2572197</td>
<td>Seminar in strategic and behavioral marketing</td>
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<td>Bruno Neibecker</td>
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<td>SS 2016</td>
<td>2540524</td>
<td>Bachelor Seminar aus CRM (nur Bachelor)</td>
<td>Seminar (S)</td>
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<td>Victoria-Anne Schweigert, Andreas Geyer-Schulz, Fabian Ball, Andreas Sonnenbichler</td>
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Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of
- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
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.

Die folgenden Informationen stammen aus der Veranstaltung Seminar Management Accounting (SS 2016):

Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources).

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.

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

Literature
Will be announced in the course.

Die folgenden Informationen stammen aus der Veranstaltung Special Topics in Management Accounting (SS 2016):

Students
- are largely independently able to identify a distinct topic in Management Accounting,
- are capable to research the topic, analyze the information, to conceptualize and deduct fundamental principles and relationships from relatively unstructured information,
- can afterwards logically and systematically present the results in writing and as an oral presentation, following a scientific approach (structuring, terminology, sources).

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.

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

Literature
Will be announced in the course.

Die folgenden Informationen stammen aus der Veranstaltung Seminar in strategic and behavioral marketing (WS 16/17):

Students
- do literature search based on a given topic, identify relevant literature and evaluate this literature,
- give presentations in a scientific context in front of an auditorium to present the results of the research,
- present results of the research in a seminar thesis as a scientific publication using format requirements such as those recommended by well-known publishers.

Content
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in marketing. This problem analysis requires a interdisciplinary examination. As a special option, the implementation of methodological solutions for market research can be accomplished and discussed with respect to its application.

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

Literature
Will be allocated according the individual topics.
Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
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.
Course: Seminar in Engineering Science (Bachelor) [T-WIWI-102755]

Responsibility: Fachvertreter ingenieurwissenschaftlicher Fakultäten

Contained in: [M-WIWI-101816] Seminar Module

ECTS
Version

Learning Control / Examinations
See German version.

Conditions
See module description.

Recommendations
None
Course: Seminar in Informatics (Bachelor) [T-WIWI-103485]

Responsibility: Rudi Studer, Hartmut Schmeck, Andreas Oberweis, York Sure-Vetter, Johann Marius Zöllner

Contained in: [M-WIWI-101816] Seminar Module

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Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
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.

Die folgenden Informationen stammen aus der Veranstaltung Event Processing: Processing of Real-Time Data and their Business Potential (SS 2016):

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

- Prediction of lucrative areas / routes
- Real-time visualization of event streams
- Fraud Detection
- Sales forecast

Gladly, data with other data (e.g. weather or event data for NYC) can be linked.

Die folgenden Informationen stammen aus der Veranstaltung Developing IT-based Business Models (WS 16/17):

Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Die folgenden Informationen stammen aus der Veranstaltung Seminar Service Science, Management & Engineering (WS 16/17):

The student

- illustrates and evaluates classic and current research questions in service science, management and engineering,
- applies models and techniques in service science, also with regard to their applicability in practical cases,
- successfully gets in touch with scientific working by an in-depth working on a special scientific topic which makes the student familiar with scientific literature research and argumentation methods,
- acquires good rhetorical and presentation skills.

As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the seminar topic.
Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services. See the KSRI website for more information about this seminar: www.ksri.kit.edu

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

Literature
The student will receive the necessary literature for his research topic.

Die folgenden Informationen stammen aus der Veranstaltung Knowledge Discovery and Data Mining (SS 2016):

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

Die folgenden Informationen stammen aus der Veranstaltung Applications of Semantic MediaWiki (WS 16/17):

Content
Topics of interest include, but are not limited to:
- Analysis of Medical Processes
- Correlation analysis of medical data
- Visualization of data in SMW
- Sentiment analysis of Twitter data
- Upload Interface for SMW
- Process Matching of process data

Die folgenden Informationen stammen aus der Veranstaltung Cognitive Computing in the Medical Domain (SS 2016):

The purpose of this seminar is to collect and analyses popular medical datasets, to compare an contrast existing medical systems, to explore approaches for supporting patient diagnosis and to determine the potential of adopting already exciting solutions and algorithms to the medical domain.

Content
Topics of interest include, but are not limited to:
- Decision Support Systems
- Clinical Pathway Analysis
- AI Systems in the Medical Domain
- Ontology Analysis

Literature
Relevant Literatur will be announced during the Seminar.

Die folgenden Informationen stammen aus der Veranstaltung Linked Open Data basierte Web 3.0 Anwendungen und Services (WS 16/17):

Workload
Topics of interest include, but are not limited to:
- Travel Security
- Geo data
- Linked News
- Social Media
Course: Seminar in Mathematics (Bachelor) [T-MATH-102265]

Responsibility: Günter Last, Martin Folkers

Contained in: [M-WIWI-101816] Seminar Module

ECTS

Version 1
### Course: Seminar in Operations Research (Bachelor) [T-WIWI-103488]

**Responsibility:** Oliver Stein, Karl-Heinz Waldmann, Stefan Nickel  
**Contained in:** [M-WIWI-101816] Seminar Module

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### Learning Control / Examinations

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:
- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

### Conditions

None.

### Recommendations

See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

### Remarks

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.
Course: Seminar in Statistics (Bachelor) [T-WIWI-103489]

Responsibility: Wolf-Dieter Heller, Melanie Schienle, Oliver Grothe

Contained in: [M-WIWI-101816] Seminar Module

ECTS 3  Version 1

Learning Control / Examinations
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Conditions
None.

Recommendations
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Remarks
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.
### Course: Seminar: Legal Studies I [T-INFO-101997]

**Responsibility:** Thomas Dreier  
**Contained in:** [M-WIWI-101816] Seminar Module

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#### Events

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<td>Datenschutz durch Technik</td>
<td>Seminar (S)</td>
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<td>Oliver Raabe</td>
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<td>SS 2016</td>
<td>2400079</td>
<td>Seminar Digitale Transformation des Bürgerlichen Gesetzbuchs</td>
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<td>Benjamin Raue, Michael Bartsch</td>
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<td>SS 2016</td>
<td>2400041</td>
<td>Governance, Risk &amp; Compliance</td>
<td>Seminar (S)</td>
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<td>Hans-Rudolf Röhm</td>
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<td>SS 2016</td>
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<td>Current Issues in Patent Law</td>
<td>Seminar (S)</td>
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<td>Klaus-Jürgen Melullis</td>
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<td>SS 2016</td>
<td>2400087</td>
<td>Aktuelle Probleme des Geistigen Eigentums und des Internetrechts</td>
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<td>Benjamin Raue</td>
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<td>SS 2016</td>
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<td>Seminar &quot;Sicherer Datenaustausch in Drittstaaten nach dem Schrems-Urteil - Rolle der Datenschutzbehörden und zukünftige Regelung des Datenaustausches&quot;</td>
<td>Seminar (S)</td>
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<td>Franziska Boehm</td>
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**Die folgenden Informationen stammen aus der Veranstaltung Governance, Risk & Compliance (SS 2016):**

Der/die Studierende hat vertiefte Kenntnisse hinsichtlich der Thematik “Governance, Risk & Compliance” sowohl auf regulatorischer Ebene als auch auf betriebswirtschaftlicher Ebene. Er/sie ist in der Lage, eine konkrete Fragestellung schriftlich in Form einer Seminararbeit auszuarbeiten sowie anschließend im mündlichen Vortrag zu präsentieren.

**Content**


**Workload**

21 h Präsenzzeit, 60 h schriftliche Ausarbeitung, 9h Vortrag vorbereiten.

**Die folgenden Informationen stammen aus der Veranstaltung Current Issues in Patent Law (SS 2016):**


**Workload**

Der gesamte Arbeitsaufwand beträgt ca. 75-100 h, davon sind 22,5 h Präsenzzeit.
Course: Service Oriented Computing [T-WIWI-105801]

Responsibility: Barry Norton, Sudhir Agarwal, Rudi Studer

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS: 5
Language: deutsch/englisch
Version: 1

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<td>Service Oriented Computing</td>
<td>Vorlesung (V)</td>
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<td>Rudi Studer, Maria Maleshkova</td>
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<td>SS 2016</td>
<td>2511309</td>
<td>Exercises to Service Oriented Computing</td>
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<td>Rudi Studer, Maria Maleshkova, Felix Leif Keppmann</td>
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</table>

Learning Control / Examinations
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.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Service Oriented Computing (SS 2016):

Students will extend their knowledge and proficiency in the area of modern service-oriented technologies. Thereby, they acquire the capability to understand, apply and assess concepts and methods that are of innovative and scientific nature.

Content
Building upon basic Web service technologies the lecture introduces selected topics from advanced service computing and service engineering. In particular, focus will be placed on new Web-based architectures and applications leveraging Web 2.0, Cloud Computing, Semantic Web and other emerging technologies.

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
Literature will be announced in the lecture.
Course: Services Marketing and B2B Marketing [T-WIWI-102806]

Responsibility: Martin Klarmann, Ju-Young Kim

Contained in: [M-WIWI-101424] Foundations of Marketing

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<td>2572158</td>
<td>Services Marketing and B2B Marketing</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Martin Klarmann, Ju-Young Kim</td>
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</table>

Learning Control / Examinations

The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Conditions

None

Remarks

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

Die folgenden Informationen stammen aus der Veranstaltung Services Marketing and B2B Marketing (WS 16/17):

See German version.

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

Workload

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

Literature

Course: Simulation I [T-WIWI-102627]

Responsibility: Karl-Heinz Waldmann

Contained in:  
- [M-WIWI-101400] Stochastic Methods and Simulation  
- [M-WIWI-101840] Stochastic Methods and Simulation

ECTS 4,5  
Language deutsch  
Version 1

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<td>SS 2016</td>
<td>2550663</td>
<td>Übung zu Simulation I</td>
<td>Übung (U)</td>
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<td>Karl-Heinz Waldmann</td>
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<td>SS 2016</td>
<td>2550662</td>
<td>Simulation I</td>
<td>Vorlesung (V)</td>
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<td>SS 2016</td>
<td>2550664</td>
<td>Rechnerübung zu Simulation I</td>
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<td>Karl-Heinz Waldmann</td>
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Learning Control / Examinations

The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Conditions

None

Recommendations

None

Remarks

The course will be offered in the summer term 2015 and the summer term 2016.

Die folgenden Informationen stammen aus der Veranstaltung Simulation I (SS 2016):

The participants will be enabled to model discrete event systems that underlie stochastic influences and to analyze them using simulation. The discussion of practice-oriented case studies pursues two goals. On the one hand, the participants will be sensitized for different criteria to evaluate the performance of a stochastic discrete-event system. On the other hand, an overview of application areas of stochastic simulation is provided. In the context of the course, the basic elements of discrete-event simulation are introduced and a procedure model for the execution of simulation studies is developed. Properties of existing mathematical methods for the generation of random variables are discussed and are assigned to concrete application cases. Statistical methods for the description of simulation input data and for the interpretation of simulation results will be exemplified. The facultative computer exercise course using a simulation software comprises a practice-oriented case study that illustrates the opportunities and limitations of stochastic simulation.

Content

Generation of random numbers, Monte Carlo Integration, discrete event simulation, discrete random variables, continuous random variables, statistical analysis of simulated data.

Workload

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

Literature

- Lecture Notes
# Course: Simulation II [T-WIWI-102703]

**Responsibility:** Karl-Heinz Waldmann  
**Contained in:**  
- [M-WIWI-101400] Stochastic Methods and Simulation  
- [M-WIWI-101840] Stochastic Methods and Simulation  

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<td>Übungen zu Simulation II</td>
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<td>WS 16/17</td>
<td>2550667</td>
<td>Rechnerübungen zu Simulation II</td>
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## Learning Control / Examinations

The assessment consists of an 1h written exam following Section 4(2), 1 of the examination regulations. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by a 2/3 step of a full grade (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

### Conditions

None

### Recommendations

Foundations in the field of Simulation I [2550662] are desired.

### Remarks

The course will be offered in the winter term 2015/2016.
Course: Simulation of Coupled Systems [T-MACH-105172]

Responsibility: Marcus Geimer

Contained in:
[M-MACH-101267] Mobile Machines
[M-MACH-101265] Vehicle Development

ECTS 3
Language deutsch
Version 1

Events

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<td>2114095</td>
<td>Simulation of Coupled Systems</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Benedikt Reick, Marcus Geimer</td>
</tr>
</tbody>
</table>

Die folgenden Informationen stammen aus der Veranstaltung Simulation of Coupled Systems (SS 2016):

After completion of the course, students are able to:
- building a coupled simulation
- parameterize models
- Perform simulations
- do Troubleshooting
- check results for plausibility

Content
- Knowledge of the basics of multi-body and hydraulic simulation programs
- Possibilities of coupled simulations
- Development of a simulation model by using the example of a wheel loader
- Documentation of the result in a short report

Workload
- regular attendance: 21 hours
- total self-study: 92 hours

Literature
Elective literature:
- miscellaneous guides according the software-tools pdf-shaped
- information to the wheel-type loader
Course: Smart Energy Distribution [T-WIWI-102845]

Responsibility: Hartmut Schmeck

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS 4
Language englisch
Version 1

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<td>SS 2016</td>
<td>2511108</td>
<td>Smart Energy Distribution</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Hartmut Schmeck</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The examination will be offered latest until winter term 2016/2017 (repeaters only).
written exam, unless the number of registered students is too small

Conditions
None

Recommendations
The students should have an understanding of informatics, they would benefit from some previous knowledge of self-organisation and methods for optimisation, but this is not mandatory

Remarks
This course is offered to students of the (KIC) MSc program EnTech but may also be taken by students of the Master programs Industrial Engineering, Economics Engineering, Information Engineering and Management, and Mathematics in Economics.

Die folgenden Informationen stammen aus der Veranstaltung Smart Energy Distribution (SS 2016):

The students will develop an understanding of the basic problems that arise from decentralisation and an increased share of renewables in the power mix and they will know how to deal with these problems by using concepts like virtualisation and self-organisation. They will know how to design and apply adequate methods for smart energy distribution in various related problem settings and they will be capable to explain the appropriate use of these methods. The students will get to know the scope of topics in energy informatics.

Content
The course addresses the role of information and communication technologies for the distribution of energy. The increasing share of power generation from renewable sources and the decentralisation of power generation lead to an increasing need for local balancing of power supply and demand. While traditional power management was based on the assumption that power consumption is not controllable and that electric power cannot be stored effectively, future power management will depend significantly on much more flexibility in demand and in innovative ways of storing energy.

The course will present concepts for smart energy management that have been developed in projects on “e-energy” and electric mobility, like virtual power plants, local agent-based power management, concepts of load shifting, autonomic and organic approaches to power management in smart homes, utilization of mobile and stationary batteries for stabilization of the power grid.

The concepts presented in this course are essential for the new discipline of energy informatics.

Workload
The workload is about 120 hours (4 LP)
Course: Social Structures of Modern Societies [T-GEISTSOZ-101959]

Responsibility: Gerd Nollmann

Contained in: [M-GEISTSOZ-101167] Sociology/Empirical Social Research

ECTS Version

4 1
Course: Software Engineering [T-WIWI-100809]

Responsibility: Andreas Oberweis

Contained in: [M-WIWI-101399] Emphasis Informatics
[M-WIWI-101426] Electives in Informatics

ECTS: 4
Language: deutsch
Version: 1

Events

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<td>SS 2016</td>
<td>2511206</td>
<td>Software Engineering</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Andreas Oberweis</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment consists of an 1h written exam in the first week after lecture period.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Software Engineering (SS 2016):

Students
- are familiar with the concepts and principles of software engineering and can discuss it,
- know common software development process models and their strengths and weaknesses and can discuss it,
- know methods for requirements analysis and can use it and can model and evaluate use case models,
- know models for systems structuring and controlling as well as architecture principles of software systems and can discuss it.
- can model and evaluate component diagrams
- are familiar with basic concepts of software quality management and are able to apply software test and evaluation methods in concrete situations.

Content
The course deals with fundamental aspects of the systematically development of huge software systems. The course covers topics such as:
- software developing process models
- methods and tools for the development phases: requirements analysis, system specification, system design, programming and testing.

Workload
Lecture 30h
Exercise 15h

Review und Preparation of lectures 30h
Review and Preparation of exercises 15h
Exam preparation 29h
Exam 1h

Total: 120h

Literature

Further literature is given in the course.
Course: Software Laboratory: OR Models I [T-WIWI-102717]

Responsibility: Stefan Nickel


ECTS: 4.5
Language: deutsch
Version: 1

Events

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<tr>
<td>WS 16/17</td>
<td>2550490</td>
<td>Modellieren und OR-Software: Einführung</td>
<td>Praktikum (P)</td>
<td>3</td>
<td>Tanya Gonser, Melanie Reuter-Oppermann, Stefan Nickel</td>
</tr>
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</table>

Learning Control / Examinations

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.

Conditions

None

Recommendations

Firm knowledge of the contents from the lecture Introduction to Operations Research I [2550040] of the module Operations Research [WW1OR].

Remarks

Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered in every winter term. The planned lectures and courses for the next three years are announced online.

Die folgenden Informationen stammen aus der Veranstaltung Modellieren und OR-Software: Einführung (WS 16/17):

The student

- evaluates the possibilities of computer usage in practical applications of Operations Research,
- is capable of classifying and utilizing the general possibilities and fields of usage of modeling and implementation software for solving OR models in practice,
- models and solves problems arising in industry applications with the aid of computer-supported optimization methods.

Content

After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, ...), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis.

Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

Workload

The total workload for this course is approximately 135.0 hours. For further information see German version.
Course: Software Quality Management [T-WIWI-102895]

Responsibility: Andreas Oberweis

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

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<tr>
<td>SS 2016</td>
<td>2511209</td>
<td>Übungen zu Software-Qualitätsmanagement</td>
<td>Übung (U)</td>
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<td>Meike Ullrich, Andreas Oberweis, Timm Caporale</td>
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<td>SS 2016</td>
<td>2511208</td>
<td>Software Quality Management</td>
<td>Vorlesung (V)</td>
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<td>Andreas Oberweis</td>
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</table>

Learning Control / Examinations
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.

Conditions
None

Remarks
This course was formerly named “Software Technology: Quality Management”.

Die folgenden Informationen stammen aus der Veranstaltung Software Quality Management (SS 2016):

Students

- explain the relevant quality models,
- apply methods to evaluate the software quality and evaluate the results,
- know the mail models of software certification, compare and evaluate these models,
- write scientific theses in the area of software quality management and find own solutions for given problems.

Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

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

Total: 150h

Literature

- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Further literature is given in lectures.
### Course: Solving Finance Problems using Machine Learning  [T-WIWI-105714]

**Responsibility:** Maxim Ulrich  
**Contained in:**  [M-WIWI-102753] Machine Learning for Finance and Data Science

**ECTS** 4.5  
**Version** 1

#### Events

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<td>792500170</td>
<td>Solving Finance Problems using Machine Learning</td>
<td>Vorlesung (V)</td>
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<td>SS 2016</td>
<td>2530362</td>
<td>Solving Finance Problems using Machine Learning</td>
<td>Vorlesung (V)</td>
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<td>Maxim Ulrich</td>
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</table>

#### Learning Control / Examinations

See description of respective module.

#### Conditions

See description of respective module.

#### Recommendations

It is recommended that students share an interest for programming.

#### Remarks

New course starting summer term 2016.
Course: Special Sociology [T-GEISTSOZ-101957]

Responsibility: Gerd Nollmann

Contained in: [M-GEISTSOZ-101167] Sociology/Empirical Social Research

ECTS | Version
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4 | 1

Conditions
None.
**Course: Special Topics in Information Engineering & Management [T-WIWI-102706]**

**Responsibility:** Christof Weinhardt

**Contained in:** [M-WIWI-101434] eBusiness and Service Management

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**Learning Control / Examinations**

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).

**Conditions**

None

**Recommendations**

None

**Remarks**

All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen in the Special Topics in Information Engineering & Management course. The current topics of the practical seminars are available at the following homepage: www.iism.kit.edu/im/lehre

The Special Topics Information Engineering and Management 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 Engineering and Management 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]

Responsibility: Rudi Studer, Hartmut Schmeck, Andreas Oberweis

Contained in: [M-WIWI-101399] Emphasis Informatics
[M-WIWI-101426] Electives in Informatic

ECTS 5 Version 1

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None

Remarks
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.
Course: Special Topics of Efficient Algorithms [T-WIWI-102657]

Responsibility: Hartmut Schmeck

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS Version
5 1

Learning Control / Examinations
The assessment consists of assignments or of a bonus exam (wrt §4 (2), 3 SPO), and a written exam (60 min.) in the week after the end of the lecturing period (wrt §4 (2), 1 SPO). The exam will be offered in every semester and can be repeated on regular examination dates.

If the mark obtained in the written exam is in between 1.3 and 4.0, a successful completion of the assignments or the bonus exam will improve the mark by one level (i.e. by 0.3 or 0.4).

Conditions
None

Remarks
This course can be particularly used for recognising the external courses with the topics in the area of algorithms, data-structures and computer infrastructures but are not associated in other courses in this subject area.
Course: Special Topics of Enterprise Information Systems [T-WIWI-102676]

Responsibility: Andreas Oberweis

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS 5  Version 1

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<td>WS 16/17</td>
<td>2511224</td>
<td>Spezialvorlesung Betriebliche Informationssysteme: Informationssicherheitsmanagement</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Stefanie Betz</td>
</tr>
</tbody>
</table>

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None
Course: Special Topics of Knowledge Management [T-WIWI-102671]

Responsibility: Rudi Studer

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS 5  Version 1

Learning Control / Examinations
Assessment is provided by a written exam of 60 minutes or an oral exam during the first few weeks after the lecturing period (acc. to §4(2), 1 or 2 SPO). The exam is offered each semester and may be repeated at the regular examination day.

Conditions
None

Remarks
see german version
Course: Special Topics of Software- and Systemsengineering [T-WIWI-102678]

Responsibility: Andreas Oberweis
Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

ECTS 5  Version 1

Learning Control / Examinations
The assessment consists of an 1h written exam in the first week after lecture period.

Conditions
None

Remarks
This course can be used in particular for the acceptance of external courses whose content is in the broader area of software and systems engineering, but cannot assigned to another course of this topic.
**Course: Specific Aspects in Taxation [T-WIWI-102790]**

**Responsibility:** Armin Bader, Berthold Wigger

**Contained in:**
- [M-WIWI-101465] Topics in Finance I
- [M-WIWI-101423] Topics in Finance II
- [M-WIWI-101403] Public Finance

**Events**

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<td>2560129</td>
<td>Specific Aspects in Taxation</td>
<td>Vorlesung (VÜ)</td>
<td>Übung 3</td>
<td>Armin Bader, Berthold Wigger</td>
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**Learning Control / Examinations**

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.

**Conditions**

None

**Recommendations**

Knowledge of the collection of public revenues is assumed. Therefore it is recommended to attend the course “Öffentliche Einnahmen” beforehand.

*Die folgenden Informationen stammen aus der Veranstaltung Specific Aspects in Taxation (WS 16/17):*

See German version.

**Content**

The lecture “Special Aspects of Taxation” focuses on the effects of different taxes. The main emphasis is on German tax legislation. In addition to that, international aspects of taxation, in particular with respect to the European integration, will be discussed. The lecture consists of four parts: First specific tax problems of corporate, income, and consumption taxes are treated. Part two introduces the advantages and disadvantages of each of these taxes, in particular their incidence (“Who actually carries the tax burden?”) and their effects within the value chain. The third part then deals with the question how the different taxes contribute to public revenues. Finally, the last part compares tax systems within and outside Europe. As a special feature, guest lecturers will provide insight into practical aspects of taxation.

**Workload**

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

**Literature**

**Elective literature:**

Course: Statistical Modeling of generalized regression models [T-WIWI-103065]

Responsibility: Wolf-Dieter Heller

Contained in: [M-WIWI-101599] Statistics and Econometrics

ECTS

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<td>WS 16/17</td>
<td>2521350</td>
<td>Statistische Modellierung von Allgemeinen Regressionsmodellen</td>
<td>Vorlesung (V)</td>
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<td>Wolf-Dieter Heller</td>
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Learning Control / Examinations

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

Conditions

None

Recommendations

Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]
T Course: Statistics I [T-WIWI-102737]

Responsibility: Melanie Schienle

Contained in: [M-WIWI-101432] Introduction to Statistics

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<td>SS 2016</td>
<td>2600013</td>
<td>Tutorien zu Statistik I</td>
<td>Übung (Ü)</td>
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<td>Carlo Siebenschuh, Oliver Grothe</td>
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<td>SS 2016</td>
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<td>Statistics I</td>
<td>Vorlesung (V)</td>
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Learning Control / Examinations

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.

Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Statistics I (SS 2016):

The Student understands and applies

- the basic concepts of statistical data exploration,
- the basic definitions and theorems of probability theory.

Content

A. Descriptive Statistics: univariate und bivariate analysis
B. Probability Theory: probability space, conditional and product probabilities

Workload

150 hours (5.0 Credits).

Literature

Skriptum: Kurzfassung Statistik I

Elective literature:


Course: Statistics II [T-WIWI-102738]

Responsibility: Melanie Schienle

Contained in: [M-WIWI-101432] Introduction to Statistics

**ECTS** 5  **Language** deutsch  **Version** 1

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<td>2610020</td>
<td>Statistics II</td>
<td>Vorlesung (V)</td>
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**Learning Control / Examinations**

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.

**Conditions**

None

**Recommendations**

It is recommended to attend the course Statistics I [2600008] before the course Statistics II [2610020].

Die folgenden Informationen stammen aus der Veranstaltung Statistics II (WS 16/17):

The student

- understands and applies the basic definitions and theorems of probability theory,
- transfers these theoretical foundations to problems in parametrical mathematical statistics.

**Content**

B. Probability Theory:

- transformation of probabilities,
- parameters of location and dispersion,
- most important discrete and continuous distributions,
- covariance and correlation,
- convolution and limit distributions

C. Theory of estimation and testing:

- sufficiency of statistics,
- point estimation (optimality, ML-method ),
- internal estimations,
- theory of tests (optimality, most important examples of tests)

**Workload**

150 hours (5.0 Credits).

**Literature**

Script: Kurzfassung Statistik II

**Elective literature:**


Course: Strategic Management of Information Technology [T-WIWI-10269]

Responsibility: Thomas Wolf

Contained in:
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

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<td>SS 2016</td>
<td>2511602</td>
<td>Strategic Management of Information Technology</td>
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<td>SS 2016</td>
<td>2511603</td>
<td>Übungen zu Strategisches Management der betrieblichen Informationsverarbeitung</td>
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Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Conditions
None

Die folgenden Informationen stammen aus der Veranstaltung Strategic Management of Information Technology (SS 2016):

Students know the outer frame of IT in an enterprise and know which functions IT has within an enterprise. They understand the organization and the content of these functions.

Content
The following topics will be covered: strategic planing of ICT, architecture of ICT, overall planning of ICT, outsourcing, operation and controlling of ICT.

Literature
Course: Structural and Phase Analysis [T-MACH-102170]

Responsibility: Susanne Wagner

Contained in: [M-MACH-101262] Emphasis Materials Science

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<td>WS 16/17</td>
<td>2125763</td>
<td>Structural and phase analysis</td>
<td>Vorlesung (V)</td>
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<td>Susanne Wagner</td>
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Die folgenden Informationen stammen aus der Veranstaltung Structural and phase analysis (WS 16/17):

The students know the fundamentals of crystallography, the generation and detection of x-rays as well as their interaction with the microstructure of crystalline materials. They have detailed knowledge about the different methods of x-ray diffraction measurements and are able to analyse x-ray spectra using modern methods of x-ray analysis both qualitatively and quantitatively.

Content
The course gives an overview to generation and detection of x-rays as well as their interaction with matter. It provides an introduction to crystallography and describes modern measurement and analysis methods of x-ray diffraction.

It is arranged in the following units:

- Generation and properties of X-Ray’s
- Crystallography
- Fundamentals and application of different measuring methods
- Qualitative and quantitative phase analysis
- Texture analysis (pole figures)
- Residual stress measurements

Workload
regular attendance: 30 hours
self-study: 90 hours

Literature
1. Moderne Röntgenbeugung - Röntgendiffraktometrie für Materialwissenschaftler, Physiker und Chemiker, Spieß, Lothar / Schwarzer, Robert / Behnken, Herfried / Teichert, Gerd B.G. Teubner Verlag 2005
Die folgenden Informationen stammen aus der Veranstaltung Structural Ceramics (SS 2016):

The students know the most relevant structural ceramics (silicon carbide, silicon nitride, alumina, boron nitride, zirconia, fibre-reinforced ceramics) and their applications. They are familiar with the microstructural features, fabrication methods, and mechanical properties.

Content
The lecture gives an overview on structure and properties of the technical relevant structural ceramics silicon nitride, silicon carbide, alumina, zirconia, boron nitride and fibre-reinforced ceramics. All types of structural ceramics will be discussed in detail in terms of preparation methods of the raw materials, shaping techniques, densification, microstructural development, mechanical properties and application fields.

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature


Course: System Dynamics and Control Engineering [T-ETIT-101921]

Responsibility: Sören Hohmann

Contained in: [M-ETIT-101156] Control Engineering

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Conditions
none
Course: Systematic Materials Selection [T-MACH-100531]

Responsibility: Stefan Dietrich
Contained in: [M-MACH-101262] Emphasis Materials Science

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<td>2174577</td>
<td>Übungen zu ‘Systematische Werkstoffauswahl’</td>
<td>Übung (Ü)</td>
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<td>SS 2016</td>
<td>2174576</td>
<td>Systematic Materials Selection</td>
<td>Vorlesung (V)</td>
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<td>Stefan Dietrich</td>
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</table>

The students are able to select the best material for a given application. They are proficient in selecting materials on base of performance indices and materials selection charts. They can identify conflicting objectives and find sound compromises. They are aware of the potential and the limits of hybrid material concepts (composites, bimaterials, foams) and can determine whether following such a concept yields a useful benefit.

Content
Important aspects and criteria of materials selection are examined and guidelines for a systematic approach to materials selection are developed. The following topics are covered:

- Information and introduction
- Necessary basics of materials
- Selected methods / approaches of the material selection
- Examples for material indices and materials property charts
- Trade-off and shape factors
- Sandwich materials and composite materials
- High temperature alloys
- Regard of process influences
- Material selection for production lines
- Incorrect material selection and the resulting consequences
- Abstract and possibility to ask questions

Workload
regular attendance: 33 hours
self-study: 87 hours

Literature
Lecture notes; Problem sheets; Textbook: M.F. Ashby, A. Wanner (Hrsg.), C. Fleck (Hrsg.); Materials Selection in Mechanical Design: Das Original mit Übersetzungshilfen Easy-Reading-Ausgabe, 3. Aufl., Spektrum Akademischer Verlag, 2006 ISBN: 3-8274-1762-7
Course: Systems of Remote Sensing, Prerequisite [T-BGU-101637]

Responsibility: Stefan Hinz

Contained in:
- [M-WIWI-101646] Introduction to Natural Hazards and Risk Analysis 1
- [M-WIWI-101648] Introduction to Natural Hazards and Risk Analysis 2

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<td>SS 2016</td>
<td>6020242</td>
<td>Übungen zu Fernerkundungssysteme</td>
<td>Übung (Ü)</td>
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<td>Uwe Weidner</td>
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</table>
Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsibility: Stefan Nickel

Contained in:
- [M-WIWI-101421] Supply Chain Management
- [M-WIWI-101400] Stochastic Methods and Simulation
- [M-WIWI-101840] Stochastic Methods and Simulation

ECTS: 4.5
Language: deutsch
Version: 1

Events

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<td>SS 2016</td>
<td>2550486</td>
<td>Taktisches und operatives SCM</td>
<td>Vorlesung (V)</td>
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<td>SS 2016</td>
<td>2550487</td>
<td>Übungen zu Taktisches und operatives SCM</td>
<td>Übung (Ü)</td>
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<td>Brita Rohrbeck, Stefan Nickel</td>
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Learning Control / Examinations
The assessment consists of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Prerequisite for admission to examination is the successful completion of the online assessments.

Conditions
Prerequisite for admission to examination is the successful completion of the online assessments.

Modeled Conditions
The following conditions must be met:
- Successful completion of course [T-WIWI-105940] Prerequisite for Tactical and Operational Supply Chain Management is required before taking this course.

Recommendations
None

Remarks
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Die folgenden Informationen stammen aus der Veranstaltung Taktisches und operatives SCM (SS 2016):

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.

Literature

Elective Literature

- Domschke, Drex: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
Die folgenden Informationen stammen aus der Veranstaltung Tires and Wheel Development for Passenger Cars (SS 2016):

The students are informed about the interactions of tires, wheels and chassis. They have an overview of the processes regarding the tire and wheel development. They have knowledge of the physical relationships.

**Content**

1. The role of the tires and wheels in a vehicle
2. Geometrie of Wheel and tire, Package, load capacity and endurance, Book of requirement
3. Mobility strategy, Minispare, runflat systems and repair kit.
4. Project management: Costs, weight, planning, documentation
5. Tire testing and tire properties
6. Wheel technology including Design and manifacturing methods, Wheeltesting
7. Tire pressure: Indirect and direct measuring systems
8. Tire testing subjective and objective

**Workload**

regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**

Manuscript to the lecture
Course: Vehicle Comfort and Acoustics I [T-MACH-105154]

Responsibility: Frank Gauterin
Contained in: [M-MACH-101264] Handling Characteristics of Motor Vehicles

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<td>WS 16/17</td>
<td>2113806</td>
<td>Vehicle Comfort and Acoustics I</td>
<td>Vorlesung (V)</td>
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<td>Frank Gauterin</td>
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Modeled Conditions
The following conditions must be met:
- Course [T-MACH-102206] Vehicle Ride Comfort & Acoustics I and this course are mutually exclusive.

Die folgenden Informationen stammen aus der Veranstaltung Vehicle Comfort and Acoustics I (WS 16/17):

The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings. They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chasis regarding driving comfort and acoustic under consideration of goal conflicts.

Content
1. Perception of noise and vibrations

3. Fundamentals of acoustics and vibrations

3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations

4. The relevance of tire and chasis for the acoustic and mechanical driving comfort: phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature

2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006


The script will be supplied in the lectures
**Course: Vehicle Comfort and Acoustics II [T-MACH-105155]**

**Responsibility:** Frank Gauterin  
**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

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**Events**

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<td>SS 2016</td>
<td>2114825</td>
<td>Vehicle Comfort and Acoustics II</td>
<td>Vorlesung (V)</td>
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<td>Frank Gauterin</td>
</tr>
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</table>

**Modeled Conditions**

The following conditions must be met:
- Course [T-MACH-102205] Vehicle Ride Comfort & Acoustics II and this course are mutually exclusive.

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Die folgenden Informationen stammen aus der Veranstaltung Vehicle Comfort and Acoustics II (SS 2016):

The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

**Content**

1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
   - phenomena
   - influencing parameters
   - types of construction
   - optimization of components and systems
   - conflicts of goals
   - methods of development
3. Noise emission of motor vehicles
   - noise stress
   - sound sources and influencing parameters
   - legal restraints
   - optimization of components and systems
   - conflict of goals
   - methods of development

**Workload**

- regular attendance: 22,5 hours
- self-study: 97,5 hours

**Literature**

The script will be supplied in the lectures.
The students have an overview of the system science field of mechatronics and its application in the area of vehicle conception, especially in the context of vehicle system dynamics. They know the tools and methods for a systematical analysis, conception, and design of mechatronic systems, focussing on mechatronically extended suspension systems. They are ready to analyze, to judge and to optimize mechatronic systems.

Content
1. Introduction: Mechatronics in vehicle technology
2. Vehicle Control systems
   Brake- and traction controls (ABS, ASR, automated power train controls)
   Active and semiactive suspension systems, active stabilizor bars
   Vehicle dynamics controls, driver assistance systems
3. Modelling technology
   Mechanics - multi body dynamics
   Electrical and electronical systems, control systems
   Hydraulics
   Interdisciplinary coupled systems
4. Computer simulation technology
   Numerical integration methods
   Quality (validation, operating areas, accuracy, performance)
   Simulator-coupling (hardware-in-the-loop, software-in-the-loop)
5. Systemdesign (example: brake control)
   Demands, requirements (funktion, safety, robustness)
   Problem setup (analysis - modelling - model reduction)
   Solution approaches
   Evaluation (quality, efficiency, validation area, concept ripeness)

Workload
regular attendance: 22.5 hours
self-study: 97.5 hours

Literature
1. Ammon, D., Modellbildung und Systementwicklung in der Fahrzeugdynamik, Teubner, Stuttgart, 1997
5. Roddeck, W., Einführung in die Mechatronik, Teubner, Stuttgart, 1997
Course: Vehicle Ride Comfort & Acoustics I [T-MACH-102206]

Responsibility: Frank Gauterin

Contained in: [M-MACH-101264] Handling Characteristics of Motor Vehicles

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<td>SS 2016</td>
<td>2114856</td>
<td>Vehicle Ride Comfort &amp; Acoustics I</td>
<td>Vorlesung (V)</td>
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Conditions

Can not be combined with lecture Fahrzeugkomfort und -akustik I [2113806]

The following information comes from the Vehicle Ride Comfort & Acoustics I (SS 2016):

The students know what noises and vibrations mean, how they are generated, and how they are perceived by human beings. They have knowledge about the requirements given by users and the public. They know which components of the vehicle are participating in which way on noise and vibration phenomenon and how they could be improved. They are ready to apply different tools and methods to analyze relations and to judge them. They are able to develop the chassis regarding driving comfort and acoustic under consideration of goal conflicts.

Content

1. Perception of noise and vibrations

3. Fundamentals of acoustics and vibrations

3. Tools and methods for measurement, computing, simulation and analysis of noise and vibrations

4. The relevance of tire and chassis for the acoustic and mechanical driving comfort: phenomena, influencing parameters, types of construction, optimization of components and systems, conflict of goals, methods of development

An excursion will give insights in the development practice of a car manufacturer or a system supplier.

Workload

regular attendance: 22,5 hours
self-study: 97,5 hours

Literature


2. Russel C. Hibbeler, Technische Mechanik 3, Dynamik, Pearson Studium, München, 2006


The script will be supplied in the lectures
**Course: Vehicle Ride Comfort & Acoustics II [T-MACH-102205]**

**Responsibility:** Frank Gauterin

**Contained in:** [M-MACH-101264] Handling Characteristics of Motor Vehicles

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**Conditions**

Can not be combined with lecture Fahrzeugkomfort und -akustik II [2114825]

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Die folgenden Informationen stammen aus der Veranstaltung Vehicle Ride Comfort & Acoustics II (SS 2016):

The students have knowledge about the noise and vibration properties of the chassis components and the drive train. They know what kind of noise and vibration phenomena do exist, what are the generation mechanisms behind, which components of the vehicle participate in which way and how could they be improved. They have knowledge in the subject area of noise emission of automobiles: Noise impact, legal requirements, sources and influencing parameters, component and system optimization, target conflicts and development methods. They are ready to analyze, to judge and to optimize the vehicle with its single components regarding acoustic and vibration phenomena. They are also able to contribute competently to the development of a vehicle regarding the noise emission.

**Content**

1. Summary of the fundamentals of acoustics and vibrations

2. The relevance of road surface, wheel imperfections, springs, dampers, brakes, bearings and bushings, suspensions, engines and drive train for the acoustic and mechanical driving comfort:
   - phenomena
   - influencing parameters
   - types of construction
   - optimization of components and systems
   - conflicts of goals
   - methods of development

3. Noise emission of motor vehicles
   - noise stress
   - sound sources and influencing parameters
   - legal restraints
   - optimization of components and systems
   - conflict of goals
   - methods of development

**Workload**

regular attendance: 22,5 hours
self-study: 97,5 hours

**Literature**

The script will be supplied in the lectures.
Course: Warehousing and Distribution Systems [T-MACH-105174]

Responsibility: Melanie Schwab, Judith Weiblen
Contained in: [M-MACH-101269] Introduction to Technical Logistics

ECTS 4 Language deutsch Version 1

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<th>SWS</th>
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<tr>
<td>SS 2016</td>
<td>2118097</td>
<td>Warehousing and distribution systems</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>Kai Furmans</td>
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Conditions
none

Die folgenden Informationen stammen aus der Veranstaltung Warehousing and distribution systems (SS 2016):

Students are able to:

- Describe the areas of typical warehouse and distribution systems with the respective processes and can illustrate it with sketches,
- Use and choose strategies of warehouse and distribution systems according to requirements,
- Classify typical systems using criteria discussed in the lecture, and
- Reason about the choice of appropriate technical solutions.

Content

- Introduction
- Yard management
- Receiving
- Storage and picking
- Workshop on cycle times
- Consolidation and packing
- Shipping
- Added Value
- Overhead
- Case Study: DCRM
- Planning of warehouses
- Case study: Planning of warehouses
- Distribution networks
- Lean Warehousing

Workload
regular attendance: 21 hours
self-study: 99 hours

Literature
ARNOLD, Dieter, FURMANS, Kai (2005)
Materialfluss in Logistiksystemen, 5. Auflage, Berlin: Springer-Verlag
ARNOLD, Dieter (Hrsg.) et al. (2008)
Handbuch Logistik, 3. Auflage, Berlin: Springer-Verlag
Warehouse Science
GUDEHUS, Timm (2005)
Logistik, 3. Auflage, Berlin: Springer-Verlag
FRAZELLE, Edward (2002)
World-class warehousing and material handling, McGraw-Hill
MARTIN, Heinrich (1999)
Praxiswissen Materialflußplanung: Transport, Hanshaben, Lagern, Kommissionieren, Braunschweig, Wiesbaden: Vieweg
WISSE, Jens (2009)
Der Prozess Lagern und Kommissionieren im Rahmen des Distribution Center Reference Model (DCRM); Karlsruhe : Universi-
sitätsverlag
A comprehensive overview of scientific papers can be found at:
ROODBERGEN, Kees Jan (2007)
Warehouse Literature
Course: Web Science [T-WIWI-103112]

Responsibility: York Sure-Vetter

Contained in:
- [M-WIWI-101630] Electives in Informatics
- [M-WIWI-101628] Emphasis in Informatics

ECTS: 5
Language: englisch
Version: 1

Events

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<td>Web Science</td>
<td>Vorlesung (V)</td>
<td>2</td>
<td>York Sure-Vetter</td>
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Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Conditions
None

Remarks

Die folgenden Informationen stammen aus der Veranstaltung Web Science (WS 16/17):
The students
- look critically into current research topics in the field of Web Science and learns in particular about the topics small-world-problem, network theory, social network analysis, bibliometrics, as well as link analysis and search.
- apply interdisciplinary thinking.
- train the application of technological approaches to social science problems.

Content
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Workload
- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preparation and postprocessing: 67.5 hours
- Exam and exam preparation: 37.5 hours

Literature
## Course: Welfare Economics [T-WIWI-102610]

**Responsibility:** Clemens Puppe  
**Contained in:** [M-WIWI-101501] Economic Theory

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### Learning Control / Examinations
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).

### Conditions
The courses *Economics I: Microeconomics* [2610012] and *Economics II: Macroeconomics* [2600014] have to be completed beforehand.

### Modeled Conditions
The following conditions must be met:

1. Successful completion of course [T-WIWI-102708] *Economics I: Microeconomics* is required before taking this course.
2. Successful completion of course [T-WIWI-102709] *Economics II: Macroeconomics* is required before taking this course.

### Recommendations
None
Course: Wildcard Additional Examinations 1 [T-WIWI-104391]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS: 2  Version: 1
Course: Wildcard Additional Examinations 10 [T-WIWI-104401]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS
Version 1
Course: Wildcard Additional Examinations 11 [T-WIWI-104402]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS
2

Version
1
Course: Wildcard Additional Examinations 12 [T-WIWI-104403]

Responsibility:

Contained in:  [M-WIWI-101981] Additional Examinations

ECTS

Version

2

1

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Wildcard Additional Examinations 13 [T-WIWI-104404]

Responsibility:

Contains in: [M-WIWI-101981] Additional Examinations

ECTS: 2
Version: 1
Course: Wildcard Additional Examinations 14 [T-WIWI-104405]

Responsibility:
Contained in:  [M-WIWI-101981] Additional Examinations

ECTS  Version
2        1
Course: Wildcard Additional Examinations 15 [T-WIWI-104406]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

Conditions
None

ECTS 2
Version 1
Course: Wildcard Additional Examinations 16 [T-WIWI-104407]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS: 2
Version: 1
Course: Wildcard Additional Examinations 17 [T-WIWI-104408]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version

1

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Wildcard Additional Examinations 18 [T-WIWI-104409]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Wildcard Additional Examinations 19 [T-WIWI-104410]

Responsibility: [M-WIWI-101981] Additional Examinations

ECTS

2

Version

1
Course: Wildcard Additional Examinations 2 [T-WIWI-104392]

Responsibility:
Contained in: [M-WIWI-101981] Additional Examinations

ECTS
Version
2
1
Course: Wildcard Additional Examinations 20 [T-WIWI-104411]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS 2
Version 1
Course: Wildcard Additional Examinations 21 [T-WIWI-104412]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS 5  Version 1
Course: Wildcard Additional Examinations 22 [T-WIWI-104413]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS: 5  Version: 1
Course: Wildcard Additional Examinations 23 [T-WIWI-104414]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version

3

1
Course: Wildcard Additional Examinations 24 [T-WIWI-104415]

Responsibility: [M-WIWI-101981] Additional Examinations

Contents:

- ECTS: 3
- Version: 1

Conditions:
None
Course: Wildcard Additional Examinations 25 [T-WIWI-104416]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS: 3
Version: 1
Course: Wildcard Additional Examinations 26 [T-WIWI-104417]

Responsibility: [M-WIWI-101981] Additional Examinations

ECTS: 3
Version: 1
Course: Wildcard Additional Examinations 27 [T-WIWI-104418]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS 3

Version 1
Course: Wildcard Additional Examinations 28 [T-WIWI-104419]

Responsibility:
Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version 3 1
Course: Wildcard Additional Examinations 29 [T-WIWI-106008]

Responsibility:
Contained in: [M-WIWI-101981] Additional Examinations

ECTS 4
Version 1
Course: Wildcard Additional Examinations 3 [T-WIWI-104394]

Responsibility: [M-WIWI-101981] Additional Examinations

ECTS: 2
Version: 1
Course: Wildcard Additional Examinations 30 [T-WIWI-106009]

Responsibility: [M-WIWI-101981] Additional Examinations

ECTS: 4
Version: 1
Course: Wildcard Additional Examinations 4 [T-WIWI-104395]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version

2

1

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 08/01/2016
Course: Wildcard Additional Examinations 5 [T-WIWI-104396]

Responsibility: [M-WIWI-101981] Additional Examinations

ECTS 2  Version 1
Course: Wildcard Additional Examinations 6 [T-WIWI-104397]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version 1
Course: Wildcard Additional Examinations 7 [T-WIWI-104398]

Responsibility:
Contained in: [M-WIWI-101981] Additional Examinations

ECTS  Version
1
Course: Wildcard Additional Examinations 8 [T-WIWI-104399]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version

1
Course: Wildcard Additional Examinations 9 [T-WIWI-104400]

Responsibility:

Contained in: [M-WIWI-101981] Additional Examinations

ECTS

Version

1
Course: Windpower [T-MACH-105234]

Responsibility: Norbert Lewald

Contained in: [M-WIWI-101404] Extracurricular Module in Engineering

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Course: Workflow-Management [T-WIWI-102662]

Responsibility: Andreas Oberweis

Contained in: [M-WIWI-101630] Electives in Informatics
[M-WIWI-101628] Emphasis in Informatics

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<td>Andreas Oberweis</td>
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<td>Andreas Drescher, Andreas Oberweis</td>
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Learning Control / Examinations

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.

Conditions

None

Die folgenden Informationen stammen aus der Veranstaltung Workflow-Management (SS 2016):

Students

- explain the concepts and principles of workflow management concepts and systems and their applications,
- create and evaluatel business process models,
- analyze static and dynamic properties of workflows.

Content

A workflow is that part of a business process which is automatically executed by a computerized system. Workflow management includes the design, modelling, analysis, execution and management of workflows. Workflow management systems are standard software systems for the efficient control of processes in enterprises and organizations. Knowledge in the field of workflow management systems is especially important during the design of systems for process support. The course covers the most important concepts of workflow management. Modelling and design techniques are presented and an overview about current workflow management systems is given. Standards, which have been proposed by the workflow management coalition (WFMC), are discussed. Petri nets are proposed as a formal modelling and analysis tool for business processes. Architecture and functionality of workflow management systems are discussed. The course is a combination of theoretical foundations of workflow management concepts and of practical application knowledge.

Workload

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

Total: 150h

Literature

  Further literature is given in the lecture.
Part IX

Appendix: Qualification objectives of the Bachelor’s degree in Industrial Engineering and Management

Graduates of the Bachelor’s degree in Industrial Engineering and Management are equipped with strategically oriented knowledge in economics, engineering sciences, mathematics and information technology acquired during the three-semester core program.

The economics section includes business-related topics from the financial industry, company management, information industry, production management, marketing and accounting as well as economic correlations of microeconomics and macroeconomics.

The math section is divided into mathematics, statistics and operations research. It includes analysis and linear algebra, descriptive and inductive statistics, elementary probability theory and optimization methods.

In the engineering field, the focus is on material and energy balances, material characterization and development, engineering mechanics and electrical engineering.

The technological area is covered by the Applied and Theoretical Computer Science. Through the comprehensive methodological basis, the graduates are in a position to acknowledge and apply specialized basic concepts, methods, models and approaches. They are also able to analyze and review economic and technological structures and processes.

Graduates can independently solve basic engineering calculations and are able to apply important mathematical concepts and methods to solve concrete tasks.

The graduates have deeper knowledge in business administration, economics, computer science, operations research and engineering. Specialization is either done in the field of business administration or engineering depending on one’s wishes. Additional knowledge in statistics, law or sociology is also offered depending on one’s interests. They are able to react based on this knowledge from the different subjects and disciplines. They thereby largely operate independently in economic, technical and technological topics and survey, analyze, interpret and evaluate the situations systematically.

They are able to classify specialized problems as well as model and choose appropriate methods and procedures for solving the given tasks as well as derive improvement potentials. They know how to validate, illustrate and interpret the achieved results.

This practical use of their know-how also takes into account the social, scientific and ethical aspects.

Graduates of the Bachelor’s degree in Industrial Engineering and Management master the basics of project management and are able to assume responsibility in interdisciplinary teams. They are in a position to argue and defend their position both before expert representatives and laypersons.

They have the ability to apply the acquired information on career-related activities in the industry, service sector or in the public management as well as take up a Master’s degree program in Industrial Engineering and Management or any other related course.
Studien- und Prüfungsordnung
des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang
Wirtschaftsingenieurwesen

vom 24. September 2015


Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 KITG iVm. § 32 Absatz 3 Satz 1 LHG am 24. September 2015 erteilt.

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§ 6 Durchführung von Erfolgskontrollen
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§ 9 Wiederholung von Erfolgskontrollen, endgültiges Nichtbestehen
§ 10 Abmeldung; Versäumnis, Rücktritt
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§ 14 a Berufspraktikum
§ 15 Zusatzleistungen
§ 15 a Mastervorzug
§ 16 Überfachliche Qualifikationen
§ 17 Prüfungsausschuss
§ 18 Prüfende und Beisitzende
§ 19 Anerkennung von Studien- und Prüfungsleistungen, Studienzeiten

II. Bachelorprüfung
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§ 20 a Leistungsnachweise für die Bachelorprüfung
§ 21 Bestehen der Bachelorprüfung, Bildung der Gesamtnote
§ 22 Bachelorzeugnis, Bachelorurkunde, Diploma Supplement und Transcript of Records

III. Schlussbestimmungen
§ 23 Bescheinigung von Prüfungsleistungen
§ 24 Aberkennung des Bachelorgrades
§ 25 Einsicht in die Prüfungsakten
Präambel

Das KIT hat sich im Rahmen der Umsetzung des Bolognaprozesses zum Aufbau eines europäischen Hochschulraumes zum Ziel gesetzt, dass am Abschluss des Studiums am KIT der Mastergrad stehen soll. Das KIT sieht daher die am KIT angebotenen konsekutiven Bachelor- und Masterstudien-gänge als Gesamtkonzept mit konsekutivem Curriculum.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich

Diese Bachelorprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Bachelorstudiengang Wirtschaftsingenieurwesen am KIT.

§ 2 Ziel des Studiums, akademischer Grad

(1) Im Bachelorstudium sollen die wissenschaftlichen Grundlagen und die Methodenkompetenz der Fachwissenschaften vermittelt werden. Ziel des Studiums ist die Fähigkeit, einen konsekutiven Masterstudiengang erfolgreich absolvieren zu können sowie das erworbene Wissen berufsfeldbezogen anwenden zu können.

(2) Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad „Bachelor of Science (B.Sc.)“ für den Bachelorstudiengang Wirtschaftsingenieurwesen verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Die Regelstudienzeit beträgt sechs Semester.

Der Studiengang nimmt teil am Programm „Studienmodelle individueller Geschwindigkeit“. Die Studierenden haben im Rahmen der dortigen Kapazitäten und Regelungen bis einschließlich drittem Fachsemester Zugang zu den Veranstaltungen des MINT-Kollegs Baden-Württemberg (im folgenden MINT-Kolleg).

(2) Bei einer qualifizierten Teilnahme am MINT-Kolleg bleiben bei der Anrechnung auf die Regelstudienzeit bis zu zwei Semester unberücksichtigt. Die konkrete Anzahl der Semester richtet sich nach § 8 Absatz 1 Satz 5 bis 7.

Eine qualifizierte Teilnahme liegt vor, wenn die Studierende Veranstaltungen des MINT-Kollegs für die Dauer von mindestens einem Semester im Umfang von mindestens zwei Fachkursen (Gesamtworkload 10 Semesterwochenstunden) belegt hat. Das MINT-Kolleg stellt hierüber eine Bescheinigung aus.


§ 4 Modulprüfungen, Studien- und Prüfungsleistungen


Erfolgskontrollen gliedern sich in Studien- oder Prüfungsleistungen.

(2) Prüfungsleistungen sind:
   1. schriftliche Prüfungen,
   2. mündliche Prüfungen oder
   3. Prüfungsleistungen anderer Art.

(3) Studienleistungen sind schriftliche, mündliche oder praktische Leistungen, die von den Studierenden in der Regel lehrveranstaltungs begleitend erbracht werden. Die Bachelorprüfung darf nicht mit einer Studienleistung abgeschlossen werden.

(4) Von den Modulprüfungen sollen mindestens 70 % benotet sein.

(5) Bei sich ergänzenden Inhalten können die Modulprüfungen mehrerer Module durch eine auch modulübergreifende Prüfungsleistung (Absatz 2 Nr.1 bis 3) ersetzt werden.

§ 5 Anmeldung und Zulassung zu den Modulprüfungen und Lehrveranstaltungen

(1) Um an den Modulprüfungen teilnehmen zu können, müssen sich die Studierenden online im Studierendenportal zu den jeweiligen Erfolgskontrollen anmelden. In Ausnahmefällen kann eine Anmeldung schriftlich im Studierendenservice oder in einer anderen, vom Studierendenservice autorisierten Einrichtung erfolgen. Für die Erfolgskontrollen können durch die Prüfenden Anmeldefristen festgelegt werden. Die Anmeldung der Bachelorarbeit ist im Modulhandbuch geregelt.


(3) Zu einer Erfolgskontrolle ist zuzulassen, wer
   1. in den Bachelorstudiengang Wirtschaftsingenieurwesen am KIT eingeschrieben ist; die Zulassung beurlaubter Studierender ist auf Prüfungsleistungen beschränkt; und
   2. nachweist, dass er die im Modulhandbuch für die Zulassung zu einer Erfolgskontrolle festgelegten Voraussetzungen erfüllt und
   3. nachweist, dass er in dem Bachelorstudiengang Wirtschaftsingenieurwesen den Prüfungsanspruch nicht verloren hat und
   4. die in § 20 a genannte Voraussetzung erfüllt.

(4) Nach Maßgabe von § 30 Abs. 5 LHG kann die Zulassung zu einzelnen Pflichtveranstaltungen beschränkt werden. Der/die Prüfende entscheidet über die Auswahl unter den Studierenden, die sich rechtzeitig bis zu dem von dem/der Prüfenden festgesetzten Termin angemeldet haben unter Berücksichtigung des Studienfortschritts dieser Studierenden und unter Beachtung von § 13 Abs. 1 Satz 1 und 2, sofern ein Abbau des Überhangs durch andere oder zusätzliche Veranstal-
Die Zulassung ist abzulehnen, wenn die in Absatz 3 und 4 genannten Voraussetzungen nicht erfüllt sind.

§ 6 Durchführung von Erfolgskontrollen

(1) Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

(2) Die Art der Erfolgskontrolle (§ 4 Abs. 2 Nr. 1 bis 3, Abs. 3) wird von der/dem Prüfenden der betreffenden Lehrveranstaltung in Bezug auf die Lerninhalte der Lehrveranstaltung und die Lernziele des Moduls festgelegt. Die Art der Erfolgskontrolle, ihre Häufigkeit, Reihenfolge und Gewichtung sowie gegebenenfalls die Bildung der Modulnote müssen mindestens sechs Wochen vor Vorlesungsbeginn im Modulhandbuch bekannt gemacht werden. Im Einvernehmen von Prüfenden und Studierenden bzw. Studierendem können die Art der Prüfungsleistung sowie die Prüfungssprache auch nachträglich geändert werden; im ersten Fall ist jedoch § 4 Abs. 5 zu berücksichtigen. Bei der Prüfungsorganisation sind die Belange Studierender mit Behinderung oder chronischer Erkrankung gemäß § 13 Abs. 1 zu berücksichtigen. § 13 Abs. 1 Satz 3 und 4 gelten entsprechend.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfungsleistung auch mündlich oder eine mündlich durchzuführende Prüfungsleistung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfungsleistung bekannt gegeben werden.

(4) Bei Lehrveranstaltungen in englischer Sprache (§ 3 Abs. 6) können die entsprechenden Erfolgskontrollen in dieser Sprache abgenommen werden. § 6 Abs. 2 gilt entsprechend.


(6) Mündliche Prüfungen (§ 4 Abs. 2 Nr. 2) sind von mehreren Prüfenden (Kollegialprüfung) oder von einer/einem Prüfenden in Gegenwart einer oder eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört die/der Prüfende die anderen an der Kollegialprüfung mitwirkenden Prüfenden an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 60 Minuten pro Studierenden.

Die wesentlichen Gegenstände und Ergebnisse der mündlichen Prüfung sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist den Studierenden im Anschluss an die mündliche Prüfung bekannt zu geben.

Studierende, die sich in einem späteren Semester der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen und nach Zustimmung des Prüflings als Zuhörerinnen und Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse.

(7) Für Prüfungsleistungen anderer Art (§ 4 Abs. 2 Nr. 3) sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Prüfungsleistung dem/der Studierenden zurechenbar ist. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

Bei mündlich durchgeführten Prüfungsleistungen anderer Art muss neben der/dem Prüfenden ein/e Beisitzende/r anwesend sein, die/der zusätzlich zum/zur Prüfenden das Protokoll zeichnet.
Schriftliche Arbeiten im Rahmen einer Prüfungsleistung anderer Art haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde.“ Trägt die Arbeit diese Erklärung nicht, wird sie nicht angenommen. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

§ 6 a Erfolgskontrollen im Antwort-Wahl-Verfahren
Das Modulhandbuch regelt, ob und in welchem Umfang Erfolgskontrollen im Wege des Antwort-Wahl-Verfahrens abgelegt werden können

§ 6 b Computergestützte Erfolgskontrollen

(2) Vor der computergestützten Erfolgskontrolle hat die/der Prüfende sicherzustellen, dass die elektronischen Daten eindeutig identifiziert und unverwechselbar und dauerhaft den Studierenden zugeordnet werden können. Der störungsfreie Verlauf einer computergestützten Erfolgskontrolle ist durch entsprechende technische und fachliche Betreuung zu gewährleisten. Alle Prüfungsaufgaben müssen während der gesamten Bearbeitungszeit zur Verfügung stehen.

(3) Im Übrigen gelten für die Durchführung von computergestützten Erfolgskontrollen die §§ 6 bzw. 6 a.

§ 7 Bewertung von Studien- und Prüfungsleistungen
(1) Das Ergebnis einer Prüfungsleistung wird von den jeweiligen Prüfenden in Form einer Note festgesetzt.

(2) Folgende Noten sollen verwendet werden:

- sehr gut (very good) : hervorragende Leistung,
- gut (good) : eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt,
- befriedigend (satisfactory) : eine Leistung, die durchschnittlichen Anforderungen entspricht,
- ausreichend (sufficient) : eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt,
- nicht ausreichend (failed) : eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt.

Zur differenzierten Bewertung einzelner Prüfungsleistungen sind nur folgende Noten zugelassen:

1,0; 1,3 : sehr gut
1,7; 2,0; 2,3 : gut
2,7; 3,0; 3,3 : befriedigend
3,7; 4,0 : ausreichend
5,0 : nicht ausreichend
Diese Noten müssen in den Protokollen, im Zeugnis, im Transcript of Records sowie im Diploma Supplement verwendet werden.

(3) Studienleistungen werden mit „bestanden“ oder mit „nicht bestanden“ gewertet.

(4) Bei der Bildung der gewichteten Durchschnitte der Modulnoten, der Fachnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

(5) Jedes Modul und jede Erfolgskontrolle darf in demselben Studiengang nur einmal gewertet werden.

(6) Eine Prüfungsleistung ist bestanden, wenn die Note mindestens „ausreichend“ (4,0) ist.


(8) Die Ergebnisse der Erfolgskontrollen sowie die erworbenen Leistungspunkte werden durch den Studierendenservice des KIT verwaltet.

(9) Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein. Dabei werden die Noten der Module, die nicht zum Grundlagenstudium gemäß dem Studienplan für den Bachelorstudiengang Wirtschaftsingenieurwesen zählen, mit dem doppelten Gewicht der ausgewiesenen Leistungspunkte der Module berücksichtigt.

(10) Die Gesamtnote der Bachelorprüfung, die Fachnoten und die Modulnoten lauten:

<table>
<thead>
<tr>
<th>Notenbereich</th>
<th>Modulnote</th>
</tr>
</thead>
<tbody>
<tr>
<td>bis 1,5</td>
<td>sehr gut</td>
</tr>
<tr>
<td>von 1,6 bis 2,5</td>
<td>gut</td>
</tr>
</tbody>
</table>
| von 2,6 bis 3,5 | befriedi-
| gend         |
| von 3,6 bis 4,0 | ausreich-
| end          |

§ 8 Orientierungsprüfungen, Verlust des Prüfungsanspruchs

(1) Die Modulprüfung Mikroökonomie (VWL I) im Modul „Einführung in die Volkswirtschaftslehre“ und die Modulprüfung Statistik I im Modul „Einführung in die Statistik“ sind bis zum Ende des Prüfungszeitraums des zweiten Fachsemesters abzulegen (Orientierungsprüfungen).

(2) Wer die Orientierungsprüfungen einschließlich etwaiger Wiederholungen bis zum Ende des Prüfungszeitraums des dritten Fachsemesters nicht erfolgreich abgelegt hat, verliert den Prüfungsanspruch. Es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist; hierüber entscheidet der Prüfungsausschuss auf Antrag der oder des Studierenden. Eine zweite Wiederholung der Orientierungsprüfungen ist ausgeschlossen.

Die Fristüberschreitung hat die/der Studierende insbesondere dann nicht zu vertreten, wenn eine qualifizierte Teilnahme am MINT-Kolleg im Sinne von § 3 Abs. 2 vorliegt. Ohne ausdrückliche Genehmigung des Vorsitzenden des Prüfungsausschusses gilt eine Fristüberschreitung von

1. einem Semester als genehmigt, wenn die/der Studierende eine qualifizierte Teilnahme am MINT-Kolleg gemäß § 3 Abs. 2 im Umfang von einem Semester nachweist oder
2. zwei Semestern als genehmigt, wenn die/der Studierende eine qualifizierte Teilnahme am MINT-Kolleg gemäß § 3 Abs. 2 im Umfang von zwei Semestern nachweist.

Als Nachweis gilt die vom MINT-Kolleg gemäß § 3 Abs. 2 auszustellende Bescheinigung, die beim Studierendenservice des KIT einzureichen ist. Im Falle von Nr. 1 kann der Vorsitzende des
Prüfungsausschusses auf Antrag der Studierenden die Frist um ein weiteres Semester verlängern, wenn dies aus studienorganisatorischen Gründen für das fristgerechte Ablegen der Orientierungsprüfung erforderlich ist, insbesondere weil die Module, die Bestandteil der Orientierungsprüfung sind, nur einmal jährlich angeboten werden.

(3) Ist die Bachelorprüfung bis zum Ende des Prüfungszeitraums des neunten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang, es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist. Die Entscheidung über eine Fristverlängerung und über Ausnahmen von der Fristregelung trifft der Prüfungsausschuss unter Beachtung der in § 32 Abs. 6 LHG genannten Tätigkeiten auf Antrag des/der Studierenden. Der Antrag ist schriftlich in der Regel bis sechs Wochen vor Ablauf der in Satz 1 genannten Studienhöchstdauer zu stellen.

(4) Der Prüfungsanspruch geht auch verloren, wenn eine nach dieser Studien- und Prüfungsordnung erforderliche Studien- oder Prüfungsleistung endgültig nicht bestanden ist.

§ 9 Wiederholung von Erfolgskontrollen, endgültiges Nichtbestehen

(1) Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nr. 1) einmal wiederholen. Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend“ (5,0) bewertet, so findet eine mündliche Nachprüfung im zeitlichen Zusammenhang mit dem Termin der nicht bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als „ausreichend“ (4,0) sein.

(2) Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nr. 2) einmal wiederholen.

(3) Wiederholungsprüfungen nach Absatz 1 und 2 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten entsprechen. Ausnahmen kann der zuständige Prüfungsausschuss auf Antrag zulassen.

(4) Prüfungsleistungen anderer Art (§ 4 Absatz 2 Nr. 3) können einmal wiederholt werden.

(5) Studienleistungen können mehrfach wiederholt werden.

(6) Die Prüfungsleistung ist endgültig nicht bestanden, wenn die mündliche Nachprüfung im Sinne des Absatzes 1 mit „nicht ausreichend“ (5,0) bewertet wurde. Die Prüfungsleistung ist ferner endgültig nicht bestanden, wenn die mündliche Prüfung im Sinne des Absatzes 2 oder die Prüfungsleistung anderer Art gemäß Absatz 4 mit „nicht bestanden“ bewertet wurde.

(7) Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

(8) Eine zweite Wiederholung derselben Prüfungsleistung gemäß § 4 Abs. 2 ist nur in Ausnahmefällen auf Antrag des/der Studierenden zulässig („Antrag auf Zweitwiederholung“). Der Antrag ist schriftlich beim Prüfungsausschuss in der Regel bis zwei Monate nach Bekanntgabe der Note zu stellen.


(9) Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

(10) Die Bachelorarbeit kann bei einer Bewertung mit „nicht ausreichend“ (5,0) einmal wiederholt werden. Eine zweite Wiederholung der Bachelorarbeit ist ausgeschlossen.

§ 10 Abmeldung; Versäumnis, Rücktritt


(3) Die Abmeldung von Prüfungsleistungen anderer Art sowie von Studienleistungen ist im Modulhandbuch geregelt.

(4) Eine Erfolgskontrolle gilt als mit „nicht ausreichend“ (5,0) bewertet, wenn die Studierenden einen Prüfungstermin ohne triftigen Grund versäumen oder wenn sie nach Beginn der Erfolgskontrolle ohne triftigen Grund von dieser zurücktreten. Dasselbe gilt, wenn die Bachelorarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der/die Studierende hat die Fristüberschreitung nicht zu vertreten.


§ 11 Täuschung, Ordnungsverstoß

(1) Versuchen Studierende das Ergebnis ihrer Erfolgskontrolle durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend“ (5,0) bewertet.

(2) Studierende, die den ordnungsgemäßen Ablauf einer Erfolgskontrolle stören, können von der/dem Prüfenden oder der Aufsicht führenden Person von der Fortsetzung der Erfolgskontrolle ausgeschlossen werden. In diesem Fall gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend“ (5,0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss diese Studierenden von der Fortsetzung weiterer Erfolgskontrollen ausschließen.

(3) Studierende können innerhalb einer Frist von einem Monat verlangen, dass Entscheidungen gemäß Absatz 1 und 2 vom Prüfungsausschuss überprüft werden.

(4) Näheres regelt die Allgemeine Satzung des KIT zur Redlichkeit bei Prüfungen und Praktika in der jeweils gültigen Fassung.

§ 12 Mutterschutz, Elternzeit, Wahrnehmung von Familienpflichten


(2) Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweils gültigen Gesetzes (Bundeselterngeld- und Elternzeitgesetz - BEEG) auf Antrag zu berücksichtigen. Der/die Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem an die Elternzeit angetreten werden soll, dem Prüfungsausschuss, unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum die Elternzeit in Anspruch genommen werden soll. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einer Arbeit-

(3) Der Prüfungsausschuss entscheidet auf Antrag über die flexible Handhabung von Prüfungsfristen entsprechend den Bestimmungen des Landeshochschulgesetzes, wenn Studierende Familienpflichten wahrzunehmen haben. Absatz 2 Satz 4 bis 6 gelten entsprechend.

§ 13 Studierende mit Behinderung oder chronischer Erkrankung


(2) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen Zeit oder Form abzulegen, kann der Prüfungsausschuss gestatten, die Erfolgskontrollen in einem anderen Zeitraum oder einer anderen Form zu erbringen. Insbesondere ist behinderten Studierenden zu gestatten, notwendige Hilfsmittel zu benutzen.

(3) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, die Lehrveranstaltungen regelmäßig zu besuchen oder die gemäß § 20 erforderlichen Studien- und Prüfungsleistungen zu erbringen, kann der Prüfungsausschuss auf Antrag gestatten, dass einzelne Studien- und Prüfungsleistungen nach Ablauf der in dieser Studien- und Prüfungsordnung vorgesehenen Fristen absolviert werden können.

§ 14 Modul Bachelorarbeit

(1) Voraussetzung für die Zulassung zum Modul Bachelorarbeit ist, dass die/den Studierende
1. Modulprüfungsleistungen im Umfang von mindestens 120 LP erfolgreich abgelegt und
2. alle Modulprüfungen des Grundlagenprogramms abgeschlossen hat,
Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

(3) Thema, Aufgabenstellung und Umfang der Bachelorarbeit sind von dem Betreuer bzw. der 
Betreuerin so zu begrenzen, dass sie mit dem in Absatz 4 festgelegten Arbeitsaufwand bearbei-
tet werden kann.

(4) Die Bachelorarbeit soll zeigen, dass die Studierenden in der Lage sind, ein Problem aus ih-
rem Studienfach selbstständig und in begrenzter Zeit nach wissenschaftlichen Methoden zu be-
arbeiten. Der Umfang der Bachelorarbeit entspricht 12 Leistungspunkten. Die maximale Bearbei-
tungsdauer beträgt sechs Monate. Thema und Aufgabenstellung sind an den vorgesehenen Um-
fang anzupassen. Der Prüfungsausschuss legt fest, in welchen Sprachen die Bachelorarbeit 
geschrieben werden kann. Auf Antrag des Studierenden kann der/die Prüfende genehmigen, 
dass die Bachelorarbeit in einer anderen Sprache als Deutsch geschrieben wird.

(5) Bei der Abgabe der Bachelorarbeit haben die Studierenden schriftlich zu versichern, dass sie 
die Arbeit selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel 
benutzt haben, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht 
und die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen 
Fassung beachtet haben. Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht ange-
nommen. Die Erklärung kann wie folgt lauten: „Ich versichere wahrheitsgemäß, die Arbeit 
selbstständig verfasst, alle benutzten Hilfsmittel vollständig und genau angegeben und alles 
kenntlich gemacht zu haben, was aus Arbeiten anderer vererbt oder mit Abänderungen 
entnommen wurde sowie die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in 
der jeweils gültigen Fassung beachtet zu haben.“ Bei Abgabe einer unwahren Versicherung wird 
die Bachelorarbeit mit „nicht ausreichend“ (5,0) bewertet.

(6) Der Zeitpunkt der Ausgabe des Themas der Bachelorarbeit ist durch die Betreuerin/ den Bet-
reuer und die/den Studierenden festzuhalten und dies beim Prüfungsausschuss aktenkundig zu 
machen. Der Zeitpunkt der Abgabe der Bachelorarbeit ist durch den/die Prüfende/n beim Prü-
fungsausschuss aktenkundig zu machen. Das Thema kann nur einmal und nur innerhalb des 
ersten Monats der Bearbeitungszeit zurückgegeben werden. Macht der oder die Studierende 
einen triftigen Grund geltend, kann der Prüfungsausschuss die in Absatz 3 festgelegte Bearbei-
tungsdauer auf Antrag der oder des Studierenden um höchstens einen Monat verlängern. Wird 
die Bachelorarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend“ (5,0) bewertet, 
es sei denn, dass die Studierenden dieses Versäumnis nicht zu vertreten haben.

(7) Die Bachelorarbeit wird von mindestens einem/einer Hochschullehrer/in oder einem/einer 
leitenden Wissenschaftler/in gemäß § 14 abs. 3 Ziff. 1 KITG und einem/einer weiteren Prüfen-
den bewertet. In der Regel ist eine/r der Prüfenden die Person, die die Arbeit gemäß Absatz 2 
vergeben hat. Bei nicht übereinstimmender Beurteilung dieser beiden Personen setzt der Prü-
fungsausschuss im Rahmen der Bewertung dieser beiden Personen die Note der Bachelorarbeit 
fest; er kann auch einen weiteren Gutachter bestellen. Die Bewertung hat innerhalb von sechs 
Wochen nach Abgabe der Bachelorarbeit zu erfolgen.

§ 14 a Berufspraktikum

(1) Während des Bachelorstudiums ist ein Berufspraktikum abzuleisten, welches geeignet ist, 
den Studierenden eine Anschauung von berufspraktischer Tätigkeit in Wirtschaftsingenieurwe-
sen zu vermitteln. Dem Berufspraktikum sind zehn Leistungspunkte zugeordnet.

(2) Die Studierenden setzen sich in eigener Verantwortung mit geeigneten privaten oder öffentli-
chen Einrichtungen in Verbindung, an denen das Praktikum abgeleistet werden kann. Das Nähe-
re regelt das Modulhandbuch.

§ 15 Zusatzleistungen

(1) Es können auch weitere Leistungspunkte (Zusatzleistungen) im Umfang von höchstens 30 
LP aus dem Gesamtangebot des KIT erworben werden. § 3 und § 4 der Prüfungsordnung blei-
ben davon unberührt. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt- und 
Modulnoten ein. Die bei der Festlegung der Modulnote nicht berücksichtigten LP werden als Zu-

(2) Die Studierenden haben bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren. Auf Antrag der Studierenden kann die Zuordnung des Moduls später geändert werden.

§ 15 a Mastervorzug


§ 16 Überfachliche Qualifikationen

Neben der Vermittlung von fachlichen Qualifikationen ist der Auf- und Ausbau überfachlicher Qualifikationen im Umfang von mindestens 6 LP Bestandteil eines Bachelorstudiums. Überfachliche Qualifikationen können additiv oder integrativ vermittelt werden.

§ 17 Prüfungsausschuss


(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben für alle Regelfälle auf die/den Vorsitzende/n des Prüfungsausschusses übertragen. In dringenden Angelegenheiten, deren Erledigung nicht bis zu der nächsten Sitzung des Prüfungsausschusses warten kann, entscheidet die/den Vorsitzende/n des Prüfungsausschusses.


(6) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen KIT-Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses eine fachlich zuständige und von der betroffenen KIT-Fakultät zu nennende prüfungsberechtigte Person hinzuzuziehen.


§ 18 Prüfende und Beisitzende

(1) Der Prüfungsausschuss bestellt die Prüfenden. Er kann die Bestellung der/dem Vorsitzenden übertragen.

(2) Prüfende sind Hochschullehr/innen sowie leitende Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG, habilitierte Mitglieder und akademische Mitarbeiter/innen gemäß § 52 LHG, welche einer KIT-Fakultät angehören und denen die Prüfungsbeauftragung übertragen wurde; desgleichen kann wissenschaftlichen Mitarbeitern gemäß § 14 Abs. 3 Ziff. 2 KITG die Prüfungsbeauftragung übertragen werden. Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat.

(3) Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zu Prüfenden bestellt werden, sofern eine KIT-Fakultät eine Prüfungsbeauftragung erteilt hat und sie die gemäß Absatz 2 Satz 2 vorausgesetzte Qualifikation nachweisen können.

(4) Die Beisitzenden werden durch die Prüfenden benannt. Zu Beisitzenden darf nur bestellt werden, wer einen akademischen Abschluss in einem Studiengang der Bereiche Wirtschafts- oder Ingenieurwissenschaften oder einen gleichwertigen akademischen Abschluss erworben hat.

§ 19 Anerkennung von Studien- und Prüfungsleistungen, Studienzeiten

(1) Studien- und Prüfungsleistungen sowie Studienzeiten, die in Studiengängen an staatlichen oder staatlich anerkannten Hochschulen und Berufsakademien der Bundesrepublik Deutschland oder an ausländischen staatlichen oder staatlich anerkannten Hochschulen erbracht wurden, werden auf Antrag der Studierenden anerkannt, sofern hinsichtlich der erworbenen Kompetenzen kein wesentlicher Unterschied zu den Leistungen oder Abschlüssen besteht, die ersetzt werden sollen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung vorzunehmen. Bezüglich des Umfangs einer zur Anerkennung vorgelegten Studienleistung (Anrechnung) werden die Grundsätze des ECTS herangezogen.

(2) Die Studierenden haben die für die Anerkennung erforderlichen Unterlagen vorzulegen. Studierende, die neu in den Bachelorstudiengang Wirtschaftsingenieurwesen immatrikuliert wurden, haben den Antrag mit den für die Anerkennung erforderlichen Unterlagen innerhalb eines Semesters nach Immatrikulation zu stellen. Bei Unterlagen, die nicht in deutscher oder englischer Sprache vorliegen, kann eine amtlich beglaubigte Übersetzung verlangt werden. Die Beweislast
dafür, dass der Antrag die Voraussetzungen für die Anerkennung nicht erfüllt, liegt beim Prüfungsausschuss.

(3) Werden Leistungen angerechnet, die nicht am KIT erbracht wurden, werden sie im Zeugnis als „anerkannt“ ausgewiesen.

Liegen Noten vor, werden die Noten, soweit die Notensysteme vergleichbar sind, übernommen und in die Berechnung der Modulnoten und der Gesamtnote einbezogen. Sind die Notensysteme nicht vergleichbar, können die Noten umgerechnet werden. Liegen keine Noten vor, wird der Vermerk „bestanden“ aufgenommen.

(4) Bei der Anerkennung von Studien- und Prüfungsleistungen, die außerhalb der Bundesrepublik Deutschland erbracht wurden, sind die von der Kultusministerkonferenz und der Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen der Hochschulpartnerschaften zu beachten.

(5) Außerhalb des Hochschulsystems erworbenen Kenntnisse und Fähigkeiten werden angerechnet, wenn sie nach Inhalt und Niveau den Studien- und Prüfungsleistungen gleichwertig sind, die ersetzt werden sollen und die Institution, in der die Kenntnisse und Fähigkeiten erworben wurden, ein genormtes Qualitätssicherungssystem hat. Die Anrechnung kann in Teilen versagt werden, wenn mehr als 50 Prozent des Hochschulstudiums ersetzt werden soll.


II. Bachelorprüfung

§ 20 Umfang und Art der Bachelorprüfung

(1) Die Bachelorprüfung besteht aus den Modulprüfungen nach Absatz 2 sowie dem Modul Bachelorarbeit (§ 14) und dem Berufspraktikum (§ 14 a).

(2) Es sind Modulprüfungen in folgenden Pflichtfächern abzulegen:

1. Betriebswirtschaftslehre: Modul(e) im Umfang von 24 LP,
2. Volkswirtschaftslehre: Modul(e) im Umfang von 19 LP,
3. Informatik: Modul(e) im Umfang von 24 LP,
4. Operations Research: Modul(e) im Umfang von 18 LP,
5. Ingenieurwissenschaften: Modul(e) im Umfang von 21 LP,
6. Mathematik: Modul(e) im Umfang von 21 LP,
7. Statistik: Modul(e) im Umfang von 10 LP,
8. Wahlpflichtbereich: Modul(e) im Umfang von 21 LP.

Die Festlegung der zur Auswahl stehenden Module und deren Fachzuordnung wird im Modulhandbuch getroffen.

Die Vermittlung überfachlicher Qualifikationen im Umfang von 6 LP findet im Rahmen der fachwissenschaftlichen Module und dem Berufspraktikum statt.

§ 20 a Leistungsnachweise für die Bachelorprüfung

Voraussetzung für die Anmeldung zur letzten Modulprüfung der Bachelorprüfung ist die Be- scheinigung über das erfolgreich abgeleistete Berufspraktikum nach § 14 a. In Ausnahmefällen, die die Studierenden nicht zu vertreten haben, kann der Prüfungsausschuss die nachträgliche Vorlage dieses Leistungsnachweises genehmigen.
§ 21 Bestehen der Bachelorprüfung, Bildung der Gesamtnote

(1) Die Bachelorprüfung ist bestanden, wenn alle in § 20 genannten Modulprüfungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Bachelorprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt der Fachnoten sowie des Moduls Bachelorarbeit.

Dabei werden die Noten der Fächer gemäß § 20 Abs. 2 Ziffer 1 - 7 mit dem Gewicht der einzelnen Module berücksichtigt, das der jeweiligen Fachnotenberechnung gemäß § 7 Abs. 9 zugrunde liegt. Die Note des Profilfachs gemäß § 20 Abs. 2 Nr. 8 sowie die Note des Moduls Bachelorarbeit werden mit dem doppelten Gewicht ihrer Leistungspunkte berücksichtigt.

(3) Haben Studierende die Bachelorarbeit mit der Note 1,0 und die Bachelorprüfung mit einem Durchschnitt von 1,1 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen.

§ 22 Bachelorzeugnis, Bachelorurkunde, Diploma Supplement und Transcript of Records


(3) Mit dem Zeugnis erhalten die Studierenden ein Diploma Supplement in deutscher und englischer Sprache, das den Vorgaben des jeweils gültigen ECTS Users’ Guide entspricht sowie ein Transcript of Records in deutscher und englischer Sprache.


III. Schlussbestimmungen

§ 23 Bescheinigung von Prüfungsleistungen

Haben Studierende die Bachelorprüfung endgültig nicht bestanden, wird ihnen auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Studien- und Prüfungsleistungen und deren Noten sowie die zur Prüfung noch
fehlenden Studien- und Prüfungsleistungen enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 24 Aberkennung des Bachelorgrades

(1) Haben Studierende bei einer Prüfungsleistung getäuscht und wird diese Tatsache nach der Aushändigung des Zeugnisses bekannt, so können die Noten der Modulprüfungen, bei denen getäuscht wurde, berichtigt werden. Gegebenenfalls kann die Modulprüfung für „nicht ausreichend“ (5,0) und die Bachelorprüfung für „nicht bestanden“ erklärt werden.

(2) Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat die/der Studierende die Zulassung vorsätzlich zu Unrecht erwirkt, so kann die Modulprüfung für „nicht ausreichend“ (5,0) und die Bachelorprüfung für „nicht bestanden“ erklärt werden.

(3) Vor einer Entscheidung des Prüfungsausschusses ist Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Mit dem unrichtigen Zeugnis ist auch die Bachelorurkunde einzuziehen, wenn die Bachelorprüfung aufgrund einer Täuschung für „nicht bestanden“ erklärt wurde.


(6) Die Aberkennung des akademischen Grades richtet sich nach § 35 Abs. 7 LHG.

§ 25 Einsicht in die Prüfungsakten

(1) Nach Abschluss der Bachelorprüfung wird den Studierenden auf Antrag innerhalb eines Jahres Einsicht in das Prüfungsexemplar ihrer Bachelorarbeit, die darauf bezogenen Gutachten und in die Prüfungsprotokolle gewährt.

(2) Für die Einsichtnahme in die schriftlichen Modulprüfungen, schriftlichen Modulteilprüfungen bzw. Prüfungsprotokolle gilt eine Frist von einem Monat nach Bekanntgabe des Prüfungsergebnisses.

(3) Der/die Prüfende bestimmt Ort und Zeit der Einsichtnahme.

(4) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 26 Inkrafttreten, Übergangsvorschriften

(1) Diese Studien- und Prüfungsordnung tritt am 01. Oktober 2015 in Kraft und gilt für

1. Studierende, die ihr Studium im Bachelorstudiengang Wirtschaftsingenieurwesen am KIT im ersten Fachsemester aufnehmen, sowie

2. für Studierende, die ihr Studium im Bachelorstudiengang Wirtschaftsingenieurwesen am KIT in einem höheren Fachsemester aufnehmen, sofern dieses Fachsemester nicht über dem Fachsemester liegt, das der erste Jahrgang nach Ziff. 1 erreicht.


1. Studierende, die ihr Studium im Bachelorstudiengang Wirtschaftsingenieurwesen am KIT zu- letzt im Sommersemester 2015 aufgenommen haben, sowie

2. für Studierende, die ihr Studium im Bachelorstudiengang Wirtschaftsingenieurwesen am KIT ab dem Wintersemester 2015/16 in einem höheren Fachsemester aufnehmen, sofern das Fach-
semester über dem liegt, das der erste Jahrgang nach Absatz 1 Ziff. 1 erreicht hat. Im Übrigen tritt sie außer Kraft.

(3) Studierende, die auf Grundlage der Studien- und Prüfungsordnung für den Bachelorstudien-
chung des KIT Nr. 19 vom 28. März 2014), ihr Studium am KIT aufgenommen haben, können
Prüfungen auf Grundlage dieser Studien- und Prüfungsordnung letztmalig bis zum Ende des
Prüfungszeitraums des Sommersemesters 2020 ablegen.

Karlsruhe, den 24. September 2015

Professor Dr.-Ing. Holger Hanselka
(Präsident)
Neubekanntmachung der Studien- und Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Wirtschaftsingenieurwesen

in der Fassung vom 15. August 2008


Der Rektor hat seine Zustimmung am 06. März 2007 erteilt.

Aus Gründen der Lesbarkeit ist in dieser Satzung nur die männliche Sprachform gewählt worden. Alle personenbezogenen Aussagen gelten jedoch stets für Frauen und Männer gleichermaßen.

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I. Allgemeine Bestimmungen

§ 1 Geltungsbereich, Ziele
(1) Diese Bachelorprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Bachelorstudiengang Wirtschaftsingenieurwesen an der Universität Karlsruhe (TH).

(2) Im Bachelorstudium sollen die wissenschaftlichen Grundlagen und die Methodenkompetenz der Fachwissenschaften vermittelt werden. Ziel des Studiums ist die Fähigkeit, das erworbenen Wissen berufsfeldbezogen anzuwenden sowie einen konsekutiven Masterstudiengang erfolgreich absolvieren zu können.

§ 2 Akademischer Grad
Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad „Bachelor of Science“ (abgekürzt: „B.Sc.”) für den Bachelorstudiengang Wirtschaftsingenieurwesen verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte
(1) Die Regelstudienzeit beträgt sechs Semester. Sie umfasst ein Betriebspraktikum, Prüfungen und die Bachelorarbeit.

(2) Die im Studium zu absolvierenden Lehrinhalte sind auf Fächer verteilt. Die Fächer sind in Module gegliedert, die jeweils aus einer Lehrveranstaltung oder mehreren thematisch und zeitlich aufeinander bezogenen Lehrveranstaltungen bestehen. Studienplan oder Modulhandbuch beschreiben Art, Umfang und Zuordnung der Module zu einem Fach sowie die Möglichkeiten, Module untereinander zu kombinieren. Die Fächer und ihr Umfang werden in § 17 definiert.


(4) Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studienleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 180 Leistungspunkte.

(5) Die Leistungspunkte sind in der Regel gleichmäßig auf die Semester zu verteilen.

(6) Lehrveranstaltungen/Prüfungen können auch in englischer Sprache angeboten/abgenommen werden.

§ 4 Aufbau der Prüfungen

(2) Erfolgskontrollen sind:
   1. schriftliche Prüfungen,
   2. mündliche Prüfungen,
   3. Erfolgskontrollen anderer Art.

Erfolgskontrollen anderer Art sind z. B. Vorträge, Marktstudien, Projekte, Fallstudien, Experimente, schriftliche Arbeiten, Berichte, Seminararbeiten und Klausuren, sofern sie nicht als schriftliche oder mündliche Prüfung in der Modul- oder Lehrveranstaltungsbeschreibung im Modulhandbuch ausgewiesen sind.
(3) In den Fachprüfungen (nach § 17 Absatz 2 und Absatz 3 Nr. 1 bis 7) sind mindestens 50 vom Hundert einer Modulprüfung in Form von schriftlichen oder mündlichen Prüfungen (Absatz 2 Nr. 1 und 2) abzulegen, die restliche Prüfung erfolgt durch Erfolgskontrollen anderer Art (Absatz 2 Nr. 3).

§ 5 Anmeldung und Zulassung zu den Prüfungen

(1) Die Zulassung zu den Prüfungen nach § 4 Absatz 2 Nr. 1 und 2 sowie zur Bachelorarbeit erfolgt im Studienbüro.

Um zu Prüfungen in einem Modul zugelassen zu werden, muss beim Studienbüro eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach, wenn diese Wahlmöglichkeit besteht, abgegeben werden.

(2) Die Zulassung darf nur abgelehnt werden, wenn

1. der Studierende in einem mit Wirtschaftsingenieurwesen vergleichbaren oder einem verwandten Studiengang bereits eine Diplomvorprüfung, Diplomprüfung, Bachelor- oder Masterprüfung endgültig nicht bestanden hat, sich in einem Prüfungsverfahren befindet oder den Prüfungsanspruch in einem solchen Studiengang verloren hat oder

2. die in § 18 genannte Voraussetzung nicht erfüllt ist.

In Zweifelsfällen entscheidet der Prüfungsausschuss.

§ 6 Durchführung von Prüfungen und Erfolgskontrollen

(1) Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

(2) Die Art der Erfolgskontrollen (§ 4 Absatz 2 Nr. 1 bis 3) eines Moduls wird im Studienplan oder Modulhandbuch in Bezug auf die Lehrinhalte der betreffenden Lehrveranstaltungen und die Lehrziele des Moduls festgelegt. Die Art der Erfolgskontrollen, ihre Häufigkeit, Reihenfolge und Gewichtung, die Grundsätze zur Bildung der Modulteilprüfungsnoten und der Modulnote sowie Prüfer müssen mindestens sechs Wochen vor Semesterbeginn bekannt gegeben werden. Im Einvernehmen von Prüfer und Studierendem kann die Art der Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch § 4 Absatz 3 zu berücksichtigen.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfung auch mündlich oder eine mündlich durchzuführende Prüfung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfung bekannt gegeben werden. Bei Einvernehmen zwischen Prüfer und Kandidat kann der Prüfungsausschuss die Prüfungsform genehmigen.

Wird die Wiederholungsprüfung einer schriftlichen Prüfung in mündlicher Form abgelegt, entfällt die mündliche Nachprüfung nach § 8 Absatz 2.

(4) Macht ein Studierender glaubhaft, dass er wegen länger andauernder oder ständiger körperlicher Behinderung nicht in der Lage ist, die Erfolgskontrollen ganz oder teilweise in der vorgegebenen Form abzulegen, entscheidet der Prüfungsausschuss über eine alternative Form der Erfolgskontrollen.

(5) Bei Lehrveranstaltungen in englischer Sprache werden die entsprechenden Erfolgskontrollen in der Regel in englischer Sprache abgenommen.

Mündliche Prüfungen (§ 4 Absatz 2 Nr. 2) sind von mehreren Prüfern (Kollegialprüfung) oder von einem Prüfer in Gegenwart eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört der Prüfer die anderen an der Kollegialprüfung mitwirkenden Prüfer an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 45 Minuten pro Studierendem.


Für Erfolgskontrollen anderer Art sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Studienleistung dem Studierenden zurechenbar ist.

Schriftliche Arbeiten im Rahmen einer Erfolgskontrolle anderer Art haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde.“ Trägt die Arbeit diese Erklärung nicht, wird diese Arbeit nicht angenommen.

Bei mündlich durchgeführten Erfolgskontrollen anderer Art muss neben dem Prüfer ein Beisitzer anwesend sein, der zusätzlich zum Prüfer die Protokolle zeichnet.

§ 7 Bewertung von Prüfungen und Erfolgskontrollen

Das Ergebnis einer Erfolgskontrolle wird von den jeweiligen Prüfern in Form einer Note festgesetzt.

Im Bachelorzeugnis dürfen nur folgende Noten verwendet werden:

<table>
<thead>
<tr>
<th>1</th>
<th>sehr gut (very good)</th>
<th>hervorragende Leistung</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>gut (good)</td>
<td>eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt</td>
</tr>
<tr>
<td>3</td>
<td>befriedigend (satisfactory)</td>
<td>eine Leistung, die durchschnittlichen Anforderungen entspricht</td>
</tr>
<tr>
<td>4</td>
<td>ausreichend (sufficient)</td>
<td>eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt</td>
</tr>
<tr>
<td>5</td>
<td>nicht ausreichend (failed)</td>
<td>eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt</td>
</tr>
</tbody>
</table>

Für die Bachelorarbeit und die Modulteilprüfungen sind zur differenzierten Bewertung nur folgende Noten zugelassen:

| 1 | 1.0, 1.3 | sehr gut |
| 2 | 1.7, 2.0, 2.3 | gut |
| 3 | 2.7, 3.0, 3.3 | befriedigend |
| 4 | 3.7, 4.0 | ausreichend |
| 5 | 4.7, 5.0 | nicht ausreichend |
Diese Noten müssen in den Protokollen und in den Anlagen (Transcript of Records und Diploma Supplement) verwendet werden.

(3) Für Erfolgskontrollen anderer Art kann die Benotung „bestanden“ (passed) oder „nicht bestanden“ (failed) vergeben werden.

(4) Bei der Bildung der gewichteten Durchschnitte der Fachnoten, Modulnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

(5) Jedes Modul, jede Lehrveranstaltung und jede Erfolgskontrolle darf jeweils nur einmal angezeichnet werden.

(6) Erfolgskontrollen anderer Art dürfen in Modulteilprüfungen oder Modulprüfungen nur eingerechnet werden, wenn die Benotung nicht nach Absatz 3 erfolgt ist. Die zu dokumentierenden Erfolgskontrollen und die daran geknüpften Bedingungen werden im Studienplan oder Modulhandbuch festgelegt.

(7) Eine Modulteilprüfung ist bestanden, wenn die Note mindestens „ausreichend“ (4.0) ist.


(9) Eine Fachprüfung ist bestanden, wenn die für das Fach erforderliche Anzahl von Leistungspunkten über die im Studienplan oder Modulhandbuch definierten Modulprüfungen nachgewiesen wird.

Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

(10) Die Ergebnisse der Bachelorarbeit, der Modulprüfungen bzw. der Modulteilprüfungen, der Erfolgskontrollen anderer Art sowie die erworbenen Leistungspunkte werden durch das Studienbüro der Universität erfasst.

(11) Innerhalb der Regelstudienzeit, einschließlich der Urlaubssemester für das Studium an einer ausländischen Hochschule (Regelprüfungszeit), können in einem Fach auch mehr Leistungspunkte erworben werden als für das Bestehen der Fachprüfung erforderlich sind. In diesem Fall werden bei der Festlegung der Fachnote nur die Modulnoten berücksichtigt, die unter Abdeckung der erforderlichen Leistungspunkte die beste Fachnote ergeben.

Die in diesem Sinne für eine Fachprüfung nicht gewerteten Erfolgskontrollen und Leistungspunkte können im Rahmen der Zusatzfachprüfung nach § 13 nachträglich geltend gemacht werden.

(12) Die Gesamtnote der Bachelorprüfung, die Fachnoten und die Modulnoten lauten:

| bis 1,5 | = | sehr gut |
| 1.6 bis 2.5 | = | gut |
| 2.6 bis 3.5 | = | befriedigend |
| 3.6 bis 4.0 | = | ausreichend |
Zusätzlich zu den Noten nach Absatz 2 werden ECTS-Noten für Fachprüfungen, Modulprüfungen und für die Bachelorprüfung nach folgender Skala vergeben:

<table>
<thead>
<tr>
<th>ECTS-Note</th>
<th>Quote</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>gehört zu den besten 10 % der Studierenden, die die Erfolgskontrolle bestanden haben</td>
</tr>
<tr>
<td>B</td>
<td>25</td>
<td>gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben</td>
</tr>
<tr>
<td>C</td>
<td>30</td>
<td>gehört zu den nächsten 30 % der Studierenden, die die Erfolgskontrolle bestanden haben</td>
</tr>
<tr>
<td>D</td>
<td>25</td>
<td>gehört zu den nächsten 25 % der Studierenden, die die Erfolgskontrolle bestanden haben</td>
</tr>
<tr>
<td>E</td>
<td>10</td>
<td>gehört zu den letzten 10 % der Studierenden, die die Erfolgskontrolle bestanden haben</td>
</tr>
<tr>
<td>FX</td>
<td>nicht bestanden (failed) – es sind Verbesserungen erforderlich, bevor die Leistungen anerkannt werden</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>nicht bestanden (failed) – es sind erhebliche Verbesserungen erforderlich</td>
<td></td>
</tr>
</tbody>
</table>

Die Quote ist als der Prozentsatz der erfolgreichen Studierenden definiert, die diese Note in der Regel erhalten. Dabei ist von einer mindestens fünfjährigen Datenbasis über mindestens 30 Studierende auszugehen. Für die Ermittlung der Notenverteilungen, die für die ECTS-Noten erforderlich sind, ist das Studienbüro der Universität zuständig.

§ 8 Erlöschen des Prüfungsanspruchs, Orientierungsprüfung, Wiederholung von Prüfungen und Erfolgskontrollen

(1) Die Modulteilprüfung Mikroökonomie (VWL I) im Fach Volkswirtschaftslehre (gemäß § 17 Absatz 2 Nr. 2) und die Modulteilprüfung Statistik I im Fach Statistik (gemäß § 17 Absatz 2 Nr. 7) sind bis zum Ende des Prüfungszeitraums des zweiten Fachsemesters abzulegen (Orientierungsprüfungen).

Wer die Orientierungsprüfungen einschließlich etwaiger Wiederholungen bis zum Ende des Prüfungszeitraums des dritten Fachsemesters nicht abgelegt hat, verliert den Prüfungsanspruch im Studiengang, es sei denn, dass er die Fristüberschreitung nicht zu vertreten hat, hierüber entscheidet der Prüfungsausschuss auf Antrag des Studierenden. Eine zweite Wiederholung der Orientierungsprüfungen ist ausgeschlossen.

(2) Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nr. 1) einmal wiederholen. Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend“ bewertet, so findet eine mündliche Nachprüfung im zeitlichen Zusammenhang mit dem Termin der nicht bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als 4.0 (ausreichend) sein.

(3) Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nr. 2) einmal wiederholen.


(5) Die Wiederholung einer Erfolgskontrolle anderer Art (§ 4 Absatz 2 Nr. 3) wird im Modulhandbuch geregelt.

Bei nicht bestandener Erfolgskontrolle sind dem Kandidaten Umfang und Frist der Wiederholung in geeigneter Weise bekannt zu machen.

Die Wiederholung einer bestandenen Erfolgskontrolle ist nicht zulässig.

Eine Fachprüfung ist nicht bestanden, wenn mindestens ein Modul des Faches nicht bestanden ist.


Ist gemäß § 34 Absatz 2 Satz 3 LHG die Bachelorprüfung bis zum Beginn der Vorlesungszeit des zehnten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang, es sei denn, dass der Studierende die Fristüberschreitung nicht zu vertreten hat. Die Entscheidung darüber trifft der Prüfungsausschuss.

Der Prüfungsanspruch erlischt endgültig, wenn mindestens einer der folgenden Gründe vorliegt:
1. Der Prüfungsausschuss lehnt einen Antrag auf Fristverlängerung nach Absatz 1 oder Absatz 10 ab.
2. Die Bachelorarbeit ist endgültig nicht bestanden.
3. Eine Erfolgskontrolle nach § 4 Absatz 2 Nr. 1 und 2 ist in einem Fach endgültig nicht bestanden.

Eine Erfolgskontrolle ist dann endgültig nicht bestanden, wenn keine Wiederholungsmöglichkeit im Sinne von Absatz 2 mehr besteht oder gemäß Absatz 6 genehmigt wird. Dies gilt auch sinngemäß für die Bachelorarbeit.

§ 9 Versäumnis, Rücktritt, Täuschung, Ordnungsverstoß


Eine Modulprüfung wird mit „nicht ausreichend“ bewertet, wenn der Studierende einen Prüfungstermin ohne triftigen Grund versäumt oder wenn er nach Beginn der Prüfung ohne triftigen Grund von der Prüfung zurücktritt. Dasselbe gilt, wenn die Bachelorarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der Studierende hat die Fristüberschreitung nicht zu vertreten.

Die Anerkennung des Rücktritts ist ausgeschlossen, wenn bis zum Eintritt des Hinderungsgrunds bereits Prüfungsleistungen erbracht worden sind und nach deren Ergebnis die Prüfung nicht bestanden werden kann.

Wird der Grund anerkannt, wird ein neuer Termin anberaumt. Die bereits vorliegenden Prüfungsergebnisse sind in diesem Fall anzurechnen.

Bei Modulprüfungen, die aus mehreren Prüfungen bestehen, werden die Prüfungsleistungen dieses Moduls, die bis zu einem anerkannten Rücktritt bzw. einem anerkannten Versäumnis einer Prüfungsleistung dieses Moduls erbracht worden sind, angerechnet.

(4) Versucht der Studierende das Ergebnis einer Erfolgskontrolle durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend“ (5.0) bewertet.


(7) Näheres regelt die Allgemeine Satzung der Universität Karlsruhe (TH) zur Redlichkeit bei Prüfungen und Praktika.

§ 10 Mutterschutz, Elternzeit


§ 11 Bachelorarbeit

(1) Voraussetzung für die Zulassung zur Bachelorarbeit ist, dass der Studierende sich in der Regel im 3. Studienjahr befindet und nicht mehr als eine der Fachprüfungen der ersten drei Fachsemester laut § 17 Absatz 2 noch nachzuweisen ist.

Vor Zulassung sind Betreuer, Thema und Anmeldedatum dem Prüfungsausschuss bekannt zu geben und im Falle einer Betreuung außerhalb der Fakultät für Wirtschaftswissenschaften durch den Prüfungsausschuss zu genehmigen.

(2) Thema, Aufgabenstellung und Umfang der Bachelorarbeit sind vom Betreuer so zu begrenzen, dass sie mit dem in Absatz 3 festgelegten Arbeitsaufwand bearbeitet werden kann.


(4) Die Bachelorarbeit kann von jedem Prüfer nach § 15 Absatz 2 vergeben und betreut werden. Soll die Bachelorarbeit außerhalb der Fakultät angefertigt werden, so bedarf dies der Genehmigung des Prüfungsausschusses gemäß Absatz 1. Dem Studierenden ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. Die Bachelorarbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag des einzelnen Studierenden aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach Absatz 3 erfüllt.

(5) Bei der Abgabe der Bachelorarbeit hat der Studierende schriftlich zu versichern, dass er die Arbeit selbstständig verfasst hat und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt hat, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht und die Satzung der Universität Karlsruhe (TH) zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet hat. Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen. Bei Abgabe einer unwahren Versicherung wird die Bachelorarbeit mit „nicht ausreichend“ (5.0) bewertet.


§ 12 Berufspraktikum

(1) Während des Bachelorstudiums ist ein mindestens achtwöchiges Berufspraktikum, welches mit acht Leistungspunkten bewertet wird, abzuleisten.

(2) Der Studierende setzt sich dazu in eigener Verantwortung mit geeigneten Unternehmen in Verbindung. Der Praktikant wird von einem Prüfer nach § 15 Absatz 2 und einem Mitarbeiter des Unternehmens betreut.

(3) Am Ende des Berufspraktikums ist dem Prüfer ein kurzer Bericht abzugeben und eine Kurzpräsentation über die Erfahrungen im Berufspraktikum zu halten.

(4) Das Berufspraktikum ist abgeschlossen, wenn eine mindestens achtwöchige Tätigkeit nachgewiesen wird, der Bericht abgegeben und die Kurzpräsentation gehalten wurde. Die Durchführung des Berufspraktikums ist im Studienplan oder Modulhandbuch zu regeln. Das Berufspraktikum geht nicht in die Gesamtnote ein.
§ 13 Zusatzmodule, Zusatzleistungen

(1) Der Studierende kann sich weiteren Prüfungen in Modulen unterziehen. § 3, § 4 und § 8 Absatz 10 der Prüfungsordnung bleiben davon unberührt.


(3) Der Studierende hat bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

§ 14 Prüfungsausschuss


(2) Der Vorsitzende, sein Stellvertreter, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter werden vom Fakultätsrat bestellt, die Mitglieder der Gruppe der wissenschaftlichen Mitarbeiter nach § 10 Absatz 1 Satz 2 Nr. 2 LHG und der Vertreter der Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Der Vorsitzende und dessen Stellvertreter müssen Professor oder Juniorprofessor sein. Der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch ein Prüfungssekretariat unterstützt.

(3) Der Prüfungsausschuss regelt die Auslegung und die Umsetzung der Prüfungsordnung in die Prüfungspraxis der Fakultät. Er achtet darauf, dass die Bestimmungen der Prüfungsordnung eingehalten werden. Er berichtet regelmäßig dem Fakultätsrat über die Entwicklung der Prüfungen und Studienzeiten sowie über die Verteilung der Fach- und Gesamtnoten und gibt Anregungen zur Reform des Studienplans und der Prüfungsordnung.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben in dringenden Angelegenheiten und für alle Regelfälle auf den Vorsitzenden des Prüfungsausschusses übertragen.


(6) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses ein fachlich zuständiger und von der betroffenen Fakultät zu nennender Professor, Juniorprofessor, Hochschul- oder Privatdozent hinzuzuziehen. Er hat in diesem Punkt Stimmrecht.

§ 15 Prüfer und Beisitzende
(1) Der Prüfungsausschuss bestellt die Prüfer und die Beisitzenden. Er kann die Bestellung dem Vorsitzenden übertragen.
(2) Prüfer sind Hochschullehrer und habilitierte Mitglieder sowie wissenschaftliche Mitarbeiter der jeweiligen Fakultät, denen die Prüfungs befugnis übertragen wurde. Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat. Bei der Bewertung der Bachelorarbeit muss ein Prüfer Hochschullehrer sein.
(3) Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zum Prüfer bestellt werden, wenn die Fakultät ihnen eine diesbezügliche Prüfungs befugnis erteilt hat.
(4) Zum Beisitzenden darf nur bestellt werden, wer einen dem jeweiligen Prüfungsgegenstand entsprechenden akademischen Abschluss erworben hat.

§ 16 Anrechnung von Studienzeiten, Anerkennung von Studienleistungen und Modulprüfungen
(2) Werden Leistungen angerechnet, so werden die Noten – soweit die Notensysteme vergleichbar sind – übernommen und in die Berechnung der Modulnoten und der Gesamtnote einbezogen. Falls es sich dabei um Leistungen handelt, die im Rahmen eines Auslandsstudiums erbracht werden, während der Studierende an der Universität Karlsruhe (TH) für Wirtschaftsingenieurwesen immatrikuliert ist, kann der Prüfungsausschuss für ausgewählte Sprachen die Dokumentation anerkannter Studienleistungen im Transcript of Records mit ihrer fremdsprachlichen Originalbezeichnung festlegen. Liegen keine Noten vor, wird die Leistung nicht anerkannt. Der Studierende hat die für die Anrechnung erforderlichen Unterlagen vorzulegen.
(3) Bei der Anrechnung von Studienzeiten und der Anerkennung von Studienleistungen und Modulprüfungen, die außerhalb der Bundesrepublik erbracht wurden, sind die von der Kultusministerkonferenz und der Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen der Hochschulpartnerschaften zu beachten.
(4) Absatz 1 gilt auch für Studienzeiten, Studienleistungen und Modulprüfungen, die in staatlich anerkannten Fernstudien und an anderen Bildungseinrichtungen, insbesondere an staatlichen oder staatlich anerkannten Berufsakademien erworben wurden.
(5) Die Anerkennung von Teilen der Bachelorprüfung kann versagt werden, wenn in einem Studiengang mehr als die Hälfte aller Erfolgskontrollen und/oder mehr als die Hälfte der erforderlichen Leistungspunkte und/oder die Bachelorarbeit anerkannt werden sollen.
(6) Zuständig für die Anrechnungen ist der Prüfungsausschuss. Vor Feststellungen über die Gleichwertigkeit sind die zuständigen Fachver treter zu hören. Der Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.
II. Bachelorprüfung

§ 17 Umfang und Art der Bachelorprüfung


(2) In den ersten drei Semestern sind Fachprüfungen aus folgenden Fächern durch den Nachweis von Leistungspunkten in einem oder mehreren Modulen abzulegen:
   1. Betriebswirtschaftslehre im Umfang von 15 Leistungspunkten,
   2. Volkswirtschaftslehre im Umfang von 10 Leistungspunkten,
   3. Informatik im Umfang von 15 Leistungspunkten,
   4. Operations Research im Umfang von 9 Leistungspunkten,
   5. Ingenieurwissenschaften im Umfang von 10 Leistungspunkten,
   6. Mathematik im Umfang von 21 Leistungspunkten,
   7. Statistik im Umfang von 10 Leistungspunkten.

Die Module, die ihnen zugeordneten Leistungspunkte und die Zuordnung der Module zu den Fächern sind im Studienplan oder Modulhandbuch festgelegt. Zur entsprechenden Modulprüfung kann nur zugelassen werden, wer die Anforderungen nach § 5 erfüllt.

(3) Im vierten bis sechsten Semester sind Fachprüfungen im Umfang von sieben Modulen mit je neun Leistungspunkten abzulegen. Die Module verteilen sich folgendermaßen auf die Fächer:
   1. Betriebswirtschaftslehre,
   2. Volkswirtschaftslehre,
   3. Informatik,
   4. Operations Research,
   5. Ingenieurwissenschaften,
   6. Betriebswirtschaftslehre oder Ingenieurwissenschaften,

Die in den Fächern zur Auswahl stehenden Module sowie die diesen zugeordneten Lehrveranstaltungen werden im Studienplan oder Modulhandbuch bekannt gegeben. Der Studienplan oder das Modulhandbuch kann auch Mehrfachmodule definieren, die aus 18 Leistungspunkten (Doppelmódul) bzw. 27 Leistungspunkten (Dreifachmodul) bestehen und für Fachprüfungen nach 1. bis 7. bei in Summe mindestens gleicher Leistungspunktezahl entsprechend anrechenbar sind. Auch die Mehrfachmodule mit ihren zugeordneten Lehrveranstaltungen, Leistungspunkten und Fächern bzw. Fächerkombinationen sind im Studienplan oder Modulhandbuch geregelt.


(6) Prüfungen nach § 17 Absatz 3 können in einem Fach nur absolviert werden, wenn eine eventuelle Prüfung dieses Fachs nach § 17 Absatz 2 erfolgreich absolviert wurde. Auf Antrag eines Studierenden kann der Prüfungsausschuss hierzu Ausnahmen genehmigen.
§ 18 Leistungsnachweise für die Bachelorprüfung

Voraussetzung für die Anmeldung zur letzten Prüfung der Bachelorprüfung nach § 17 Absatz 1 ist die Bescheinigung über das erfolgreich abgeleistete Berufspraktikum nach § 12. In Ausnahmefällen, die der Studierende nicht zu vertreten hat, kann der Prüfungsausschuss die nachträgliche Vorlage dieses Leistungsnachweises genehmigen.

§ 19 Bestehen der Bachelorprüfung, Bildung der Gesamtnote

(1) Die Bachelorprüfung ist bestanden, wenn alle in § 17 genannten Prüfungsleistungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Bachelorprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt. Dabei werden die Noten gemäß § 17 Absatz 3 und 4 sowie der Bachelorarbeit jeweils mit dem doppelten Gewicht der Noten gemäß § 17 Absatz 2 berücksichtigt.

(3) Hat der Studierende die Bachelorarbeit mit der Note 1.0 und die Bachelorprüfung mit einem Durchschnitt von 1.1 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen.

§ 20 Bachelorzeugnis, Bachelorurkunde, Transcript of Records und Diploma Supplement


(2) Das Zeugnis enthält die in den Fachprüfungen, den zugeordneten Modulprüfungen sowie dem Seminarmodul und der Bachelorarbeit erzielten Noten, deren zugeordnete Leistungspunkte und ECTS-Noten und die Gesamtnote und die ihr entsprechende ECTS-Note. Das Zeugnis ist vom Dekan der Fakultät und vom Vorsitzenden des Prüfungsausschusses zu unterzeichnen.


(5) Die Bachelorurkunde, das Bachelorzeugnis und das Diploma Supplement einschließlich des Transcript of Records werden vom Studienbüro der Universität ausgestellt.
III. Schlussbestimmungen

§ 21 Bescheid über Nicht-Bestehen, Bescheinigung von Prüfungsleistungen

(1) Der Bescheid über die endgültig nicht bestandene Bachelorprüfung wird dem Studierenden durch den Prüfungsausschuss in schriftlicher Form erteilt. Der Bescheid ist mit einer Rechtsbehelfsbelehrung zu versehen.

(2) Hat der Studierende die Bachelorprüfung endgültig nicht bestanden, wird ihm auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Prüfungsleistungen und deren Noten sowie die zur Prüfung noch fehlenden Prüfungsleistungen enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 22 Aberkennung des Bachelorgrades

(1) Hat der Studierende bei einer Prüfungsleistung getäuscht und wird diese Tatsache nach der Aushändigung des Zeugnisses bekannt, so können die Noten der Modulprüfungen, bei denen getäuscht wurde, berichtigt werden. Gegebenenfalls kann die Modulprüfung für „nicht ausreichend“ (5.0) und die Bachelorprüfung für „nicht bestanden“ erklärt werden.

(2) Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass der Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat der Studierende die Zulassung vorsätzlich zu Unrecht erwirkt, so kann die Modulprüfung für „nicht ausreichend“ (5.0) und die Bachelorprüfung für „nicht bestanden“ erklärt werden.

(3) Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Mit dem unrichtigen Zeugnis ist auch die Bachelorurkunde einzuziehen, wenn die Bachelorprüfung auf Grund einer Täuschung für nicht bestanden erklärt wurde.


(6) Die Aberkennung des akademischen Grades richtet sich nach den gesetzlichen Vorschriften.

§ 23 Einsicht in die Prüfungsakten

(1) Nach Abschluss der Bachelorprüfung wird dem Studierenden auf Antrag innerhalb eines Jahres Einsicht in seine Bachelorarbeit, die darauf bezogenen Gutachten und in die Prüfungsprotokolle gewährt.


(3) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 24 In-Kraft-Treten


Karlsruhe, den 06. März 2007

Professor Dr. sc. tech. Horst Hippler
(Rektor)
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