Industrial Engineering and Management (B.Sc.)
Winter Term 2014/2015
Short version
Date: 21.08.2014
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1 Structure of the Bachelor Programme in Industrial Engineering and Management (B.Sc.)

The bachelor programme in Industrial Engineering and Management (B.Sc.) has 6 terms and consists of 180 credits (CP) including internship and bachelor thesis. The terms 1 to 3 of the programme are methodologically oriented and provide the student with the foundations of business, economic and engineering science. Terms 4 to 6 aim at the specialization and application of this knowledge.

Figure 1 shows the structure of the subjects and the credits (CP) allocated to the subjects. According to the European Credit Transfer System, one credit corresponds to a workload of 30 hours.

In the specialization studies of the third year of the bachelor programme the student has to choose one elective module of the following disciplines: Informatics, operations research, business science, economics, engineering science, statistics, law and sociology. Furthermore, the student has to attend two seminars with a minimum of six CP within the seminar module. In addition to the key skills gained in the seminars (3 CP), the student has to acquire additional key skills totalling at least 3 credits.

It is left to the student's individual curriculum (taking into account the examination and module regulations), in which terms the chosen modules will be started and completed. However, it is highly recommended to follow the proposed structure and schedule of the first 3 terms and to complete all courses and seminars before beginning the bachelor thesis.

Figure 1: Structure of the Bachelor Programme (Recommendation)
2 Key Skills

The bachelor programme Industrial Engineering and Management (B.Sc.) 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

Figure 2 shows the classification of key skills within the bachelor programme at a glance. 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.
### Basiskompetenzen (soft skills)

| Teamarbeit, soziale Kommunikation und Kreativitätstechniken | x | x |
| Präsentationserstellung und -techniken | x | x |
| Logisches und systematisches Argumentieren und Schreiben | x | x |
| Strukturierte Problemlösung und Kommunikation | x | x |

### Praxisorientierung (enabling skills)

| Handlungskompetenz im beruflichen Kontext | x |
| Kompetenzen im Projektmanagement | x |
| Betriebswirtschaftliche Grundkenntnisse | x |
| Englisch als Fachsprache | x | (x)* |

### Orientierungswissen

| Interdisziplinäres Wissen | x | x | x | (x)* |
| Institutionelles Wissen über Wirtschafts- und Rechtssysteme | x | x |
| Wissen über internationale Organisationen | x | x |
| Medien, Technik und Innovation | x | x |

*(x)* **...........**ist nicht zwingend SQ-vermittelnd; hängt von der Art der Aktivität ab (z.B. Auslandspraktikum, thematische Ausrichtung der Bachelorarbeit)

Figure 2: Key Skills
<table>
<thead>
<tr>
<th>Was</th>
<th>Wann</th>
<th>Hilfsmittel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auswahl eines Kurses aus dem HoC-Angebot (Wahlbereich 1 – 5)</td>
<td>Ab September (WS) bzw. März (SS)</td>
<td><a href="http://www.hoc.kit.edu">www.hoc.kit.edu</a> oder StudiPortal</td>
</tr>
<tr>
<td>Online-Anmeldung zum Kurs direkt beim HoC (bzw. ZAK, SPZ, ...)</td>
<td>Mittwoch vor Vorlesungsbeginn („first come, first served“!)</td>
<td><a href="http://www.hoc.kit.edu">www.hoc.kit.edu</a> (und dann je nach Kursart)</td>
</tr>
<tr>
<td>Mitteilung an Kursleiter über Kursziel von 3 ECTS</td>
<td>Zum Kursbeginn</td>
<td>Prüfungsordnung (bei WiIng, TVWL werden max. 3 ECTS anerkannt)</td>
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<tr>
<td>Ablegen und Bestehen der Erfolgskontrolle (im Umfang von 3 ECTS)</td>
<td>Am Kursende</td>
<td></td>
</tr>
<tr>
<td>HoC stellt „Schein“ aus, der vom Studierenden am HoC abgeholt wird</td>
<td>Nach Bestehen der Erfolgskontrolle</td>
<td></td>
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<tr>
<td>Einreichung des „Scheins“ beim Studienbüro</td>
<td>Nach Abholung des Scheins beim HoC</td>
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<tr>
<td>Prüfung und ggf. Rückfragen an Prüfungsamt WiWi (Herr Hilser)</td>
<td>So schnell wie möglich</td>
<td></td>
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<tr>
<td>Verbuchung der SQ im Seminarmodul durch Studienbüro</td>
<td>So schnell wie möglich</td>
<td>Zentrales Prüfungssystem (anschl. Anzeige im StudiPortal)</td>
</tr>
</tbody>
</table>

Stand: 25.02.2011

Figure 3: Process of gaining additive key skills
3 Module Handbook - a helpful guide throughout the studies

The programme 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 courses. 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 programme, 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 programme according to personal needs, interest and job perspective. The module handbook describes the modules belonging to the programme. It describes:

- 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 catalogue, 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://studium.kit.edu/meinsemester/Seiten/pruefungsanmeldung.aspx:

- 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.

Repeating exams

Principally, a failed exam 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. Requests for a second repetition of an exam require the approval of the examination committee. A request for a second repetition has to be made without delay after loosing the examination claim. A counseling interview is mandatory. For further information see http://www.wiwi.kit.edu/serviceHinweise.php.
Bonus accomplishments and additional accomplishments

**Bonus accomplishments** can be achieved on the basis of entire modules or within modules, if there are alternatives at choice. Bonus accomplishments can improve the module grade and overall grade by taking into account only the best possible combination of all courses when calculating the grades. The student has to declare a Bonus accomplishment as such at the time of registration for the exams. Exams, which have been registered as Bonus accomplishments, are subject to examination regulations. Therefore, a failed exam has to be repeated. Failing the repeat examination implies the loss of the examination claim.

**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. Up to 2 modules with a minimum of 9 CP may appear additionally in the certificate. After the approval of the examination committee, it is also possible to include modules in the certificate, which are not defined in the module handbook. Single additional courses will be recorded in the transcript of records. Courses and modules, which have been declared as bonus accomplishments, can be changed to additional accomplishments.

Further information

More detailed information about the legal and general conditions of the programme can be found in the examination regulation of the programme (in the appendix).

Used abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>LP/CP</td>
<td>Credit Points/ECTS</td>
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<td>course</td>
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<td>RÜ</td>
<td>computing lab</td>
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<td>summer term</td>
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<tr>
<td>V</td>
<td>lecture</td>
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<td>W</td>
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<td>Übung</td>
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<td>Vorlesung</td>
<td>Wintersemester</td>
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</table>
### 4 Actual Changes

Important changes are pointed out in this section in order to provide a better orientation. Although this process was done with great care, other/minor changes may exist. Please also check our updates on [http://www.wiwi.kit.edu/lehreMHB.php#mhb_aktuell](http://www.wiwi.kit.edu/lehreMHB.php#mhb_aktuell).

#### WI3BWLISM4 - CRM and Service Management (S. 38)

**Anmerkungen**

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/](http://www.em.uni-karlsruhe.de/studies/).

#### WI3BWLISM5 - Specialization in Customer Relationship Management (S. 40)

**Anmerkungen**

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/](http://www.em.uni-karlsruhe.de/studies/).
5 Modules (Foundation)

5.1 All Subjects

Module: Business Administration [WI1BWL1]

Coordination: M. Uhrig-Homburg, M. Ruckes
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

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<tr>
<td>2600026</td>
<td>Business Administration: Finance and Accounting</td>
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<td>M. Ruckes, M. Uhrig-Homburg</td>
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<td>2600023</td>
<td>Business Administration: Strategic Management and Information Engineering and Management</td>
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<tr>
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<td>2600002</td>
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<td>T. Lüdecke</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]  

Learning Outcomes
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: Business Administration [WI1BWL]

Coordination: M. Uhrig-Homburg, M. Ruckes  
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)  
Subject: Business Administration

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Courses in module

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<td>Business Administration: Strategic Management and Information Engineering and Management</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:
2nd term: Business Administration: Production Economics and Marketing [25024/25025].
3rd term: Business Administration: Finance and Accounting [25026/25027].

Learning Outcomes
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 analyze 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. The module Business Administration [WI1BWL] will not be offered from the winter semester 2012/13. It will be replaced by module Business Administration [WI1BWL1]. Students who have already been enrolled in the summer semester 2012 can complete the module.
Module: Economics [WI1VWL]

Coordination: C. Puppe
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Economics

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Courses in module

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<td>C. Puppe, P. Reiss</td>
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<td>2600014</td>
<td>Economics II: Macroeconomics</td>
<td>3/0/2</td>
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<td>B. 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. 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.

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.

Conditions

None.

Learning Outcomes

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

The total workload for this module is approximately 300 hours. For further information see German version.
Module: Introduction to Informatics [WI1INFO]

Coordination: H. Schmeck, R. Studer, D. Seese
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Informatics

<table>
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<th>ECTS Credits</th>
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Courses in module

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<tr>
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<th>Hours per week</th>
<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tbody>
<tr>
<td>2511000</td>
<td>Introduction to Programming with Java</td>
<td>3/1/2</td>
<td>W</td>
<td>5</td>
<td>D. Seese</td>
</tr>
<tr>
<td>2511010</td>
<td>Foundations of Informatics I</td>
<td>2/2</td>
<td>S</td>
<td>5</td>
<td>R. Studer, E. Simperl</td>
</tr>
<tr>
<td>2511012</td>
<td>Foundations of Informatics II</td>
<td>3/1</td>
<td>W</td>
<td>5</td>
<td>H. Schmeck</td>
</tr>
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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.
The examinations are offered every semester. Re-examinations are offered at every ordinary examination date.

- 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 received 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 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.

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]

Learning Outcomes
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: Introduction to Operations Research [WI1OR]

Coordination: S. Nickel, O. Stein, K. Waldmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Operations Research

<table>
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Courses in module

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<tr>
<td>2550040</td>
<td>Introduction to Operations Research I</td>
<td>2/2/2</td>
<td>S</td>
<td>4.5</td>
<td>S. Nickel, O. Stein, K. Waldmann</td>
</tr>
<tr>
<td>2530043</td>
<td>Introduction to Operations Research II</td>
<td>2/2/2</td>
<td>W</td>
<td>4.5</td>
<td>S. Nickel, O. Stein, K. Waldmann</td>
</tr>
</tbody>
</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].

Learning Outcomes
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.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Mass and Energy Balances for Reacting Systems [WI1ING1]

Coordination: P. Pfeifer, B. Kraushaar-Czarnetzki
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits 2.5
Cycle Every 2nd term, Winter Term
Duration 1

Courses in module

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<td>22130</td>
<td>Mass and Energy Balances for Reacting Systems</td>
<td>2/0</td>
<td>W</td>
<td>2.5</td>
<td>P. Pfeifer, B. Kraushaar-Czarnetzki</td>
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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.

Learning Outcomes
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]

Coordination: M. Hoffmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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Courses in module

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<tr>
<td>2125760</td>
<td>Materials Science I</td>
<td>2/1</td>
<td>W</td>
<td>2.5</td>
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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.

Learning Outcomes
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]

Coordination: A. Fidlin
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits: 2,5
Cycle: Every 2nd term, Winter Term
Duration: 1

Courses in module

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<tr>
<th>ID</th>
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<tr>
<td>2161238</td>
<td>Introduction to Engineering Mechanics I</td>
<td>2</td>
<td>W</td>
<td>2,5</td>
<td>A. Fidlin</td>
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</table>

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.

Learning Outcomes

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.
Module: Electrical Engineering [WI1ING4]

**Coordination:** W. Menesklou

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Engineering Science

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<tr>
<td>23223</td>
<td>Electrical Engineering I</td>
<td>2/2</td>
<td>W</td>
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<td>W. 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.

**Conditions**

None.

**Learning Outcomes**

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]

Cooperation: G. Last
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Mathematics

<table>
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<th>ID</th>
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<tr>
<td>01350</td>
<td>Mathematics I</td>
<td>4/2/2</td>
<td>W</td>
<td>7</td>
<td>G. Last, M. Folkers, D. Hug, S. Winter</td>
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<tr>
<td>01830</td>
<td>Mathematics II</td>
<td>4/2/2</td>
<td>S</td>
<td>7</td>
<td>G. Last, M. Folkers, D. Hug, S. Winter</td>
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<tr>
<td>01352</td>
<td>Mathematics III</td>
<td>4/2/2</td>
<td>W</td>
<td>7</td>
<td>G. Last, M. Folkers, D. Hug, S. 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]

Learning Outcomes
See German version.

Content

Workload
The total workload for this module is approximately 630 hours. For further information see German version.
Module: Statistics [WI1STAT]

Coordination: W. Heller
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Statistics

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Courses in module

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<th>CP</th>
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<tr>
<td>2600008</td>
<td>Statistics I</td>
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<td>W. Heller</td>
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<tr>
<td>2600020</td>
<td>Statistics II</td>
<td>4/0/2</td>
<td>W</td>
<td>5</td>
<td>W. Heller</td>
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</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.

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.

Recommendations
To some extend knowledge of the content of the module Mathematics [WW1MATH/WI1MATH] is assumed. Therefore it is recommended to attend the course Mathematics I [01350] before attending the module Statistics [WI1STAT].
It ist recommended to attend the course Statistics I [25008/25009] before the course Statistics II [25020/25021].
Each course is complemented by an exercise, a tutorium and a computing laboratory. It highly recommended to attend these too.

Learning Outcomes
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.
6 Modules (Specialization)

6.1 Business Administration

Module: Strategy and Organization [WI3BWL001]

<table>
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<tr>
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<th>Course</th>
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<th>Term</th>
<th>CP</th>
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<tr>
<td>2577900</td>
<td>Management and Strategy</td>
<td>2/0</td>
<td>S</td>
<td>4</td>
<td>H. Lindstädt</td>
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<tr>
<td>2577902</td>
<td>Managing Organizations</td>
<td>2/0</td>
<td>W</td>
<td>4</td>
<td>H. Lindstädt</td>
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<tr>
<td>2577910</td>
<td>Problem solving, communication and leadership</td>
<td>1/0</td>
<td>S</td>
<td>2</td>
<td>H. 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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes
See German version.

Content

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Management Accounting [WI3BWL1BU1]

Cooperation: M. Wouters
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

<table>
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Courses in module

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<tbody>
<tr>
<td>2579900</td>
<td>Management Accounting 1</td>
<td>2/2</td>
<td>S</td>
<td>4.5</td>
<td>M. Wouters</td>
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<tr>
<td>2579902</td>
<td>Management Accounting 2</td>
<td>2/2</td>
<td>W</td>
<td>4.5</td>
<td>M. Wouters</td>
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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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes
Students have knowledge about various management accounting techniques through study of literature and practice.

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

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

Remarks
Students who like this module are probably also interested in the courses

- 2530216 Financial Management
- 2530210 Management Accounting
Module: Industrial Production I [WI3BWL1IP]

Coordination: F. Schultmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

<table>
<thead>
<tr>
<th>ECTS Credits</th>
<th>Cycle</th>
<th>Duration</th>
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<tbody>
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Courses in module

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<tr>
<th>ID</th>
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<th>Term</th>
<th>CP</th>
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<tbody>
<tr>
<td>2581950</td>
<td>Fundamentals of Production Management</td>
<td>2/2</td>
<td>S</td>
<td>5,5</td>
<td>F. Schultmann</td>
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<tr>
<td>2581960</td>
<td>Production Economics and Sustainability</td>
<td>2/0</td>
<td>W</td>
<td>3,5</td>
<td>M. Fröhling</td>
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<tr>
<td>2581996</td>
<td>Logistics and Supply Chain Management</td>
<td>2/0</td>
<td>S</td>
<td>3,5</td>
<td>M. Wiens</td>
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</tbody>
</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

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

Recommendations
All courses are specifically designed to be taken independently.
Bearing in mind the master programme, we recommend combining this module with “Industrial Production II” [WW4BWL1IP2] and/or “Industrial Production III” [WW4BWL1IP6].

Learning Outcomes
• 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: Energy Economics [WI3BWLIIP2]

**Coordination:** W. Fichtner  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Business Administration

<table>
<thead>
<tr>
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<th>Course</th>
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<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tbody>
<tr>
<td>9</td>
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<td>1</td>
<td>2581010</td>
<td>Introduction to Energy Economics</td>
<td>2/2</td>
<td>S</td>
<td>5.5</td>
<td>W. Fichtner</td>
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<td></td>
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<td>2581012</td>
<td>Renewable Energy – Resources, Technology and Economics</td>
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<td>W</td>
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<td>R. McKenna</td>
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<td></td>
<td>2581005</td>
<td>Corporate Governance in Energy Economics</td>
<td>2/0</td>
<td>S</td>
<td>3.5</td>
<td>H. Villis</td>
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<td>2581959</td>
<td>Energy Policy</td>
<td>2/0</td>
<td>S</td>
<td>3.5</td>
<td>M. 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.

### Conditions

Successful passing of the module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO. The lecture *Introduction into Energy Economics* [2581010] has to be examined.

### 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.

### Learning Outcomes

The student can:
- understand interdependencies in energy economics and to evaluate ecological impacts in energy supply,
- assess the different energy carriers and their characteristics,
- know the energy political framework conditions,
- gain 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.)

### Workload

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

### Remarks

See German version.
### Module: Essentials of Finance [WI3BWLFBV1]

**Coordination:** M. Uhrig-Homburg, M. Ruckes

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Business Administration

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**Courses in module**

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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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**
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.

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Risk and Insurance Management [WI3BWLFBV3]

**Coordination:** U. Werner  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Business Administration

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**Courses in module**

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<tr>
<td>2530326</td>
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<td>W</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**

See German version.

**Content**

See German version.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Topics in Finance I [WI3BWLFBV5]

Co-ordination: M. Uhrig-Homburg, M. Ruckes
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

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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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.
It is only possible to choose this module in combination with the module Essentials in Finance [WI3BWLFBV1]. 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 [WI3BWLFBV6].

Learning Outcomes
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.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Topics in Finance II [WI3BWLFBV6]

Cooperation: M. Uhrig-Homburg, M. Ruckes
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

ECTS Credits
Cycle
Duration

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<td>2</td>
<td>W</td>
<td>3</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO. It is only possible to choose this module in combination with the module Essentials in Finance [WI3BWLFBV1]. 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 [WI3BWLFBV5].

Learning Outcomes
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

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

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.
Module: eBusiness and Service Management [WI3BWLISM1]

**Coordination:** C. Weinhardt

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Business Administration

### ECTS Credits

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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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

### Learning Outcomes

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.

### Workload

The total workload for this module is approximately 270 hours. For further information see German version.
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: Supply Chain Management [WI3BWLISM2]

Coordination: S. Nickel
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

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Courses in module

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<td>2540496</td>
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<td>2550486</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

Recommendations
It is recommended that exactly one out of the lectures

- Management of Business Networks
- Management of Business Networks (Introduction)

is taken.

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

**Remarks**
The planned lectures in the next terms can be found on the websites of the respective institutes IISM, IFL and IOR.
Module: eFinance [WI3BWLISM3]

Coordination: C. Weinhardt
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

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Courses in module

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<td>M. Uhrig-Homburg</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO. The course eFinance: Information Engineering and Management for Securities Trading [2540454] is compulsory and must be examined.

Learning Outcomes

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.

Workload

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

Remarks

The current seminar courses for this semester, which are complementary to this module, are listed on following webpage: http://www.iism.kit.edu/im/lehre
Module: CRM and Service Management [WI3BWLISM4]

Coordinations: A. Geyer-Schulz
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

ECTS Credits: 9
Cycle: Every term
Duration: 1

Courses in module

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<td>W</td>
<td>4,5</td>
<td>A. Geyer-Schulz</td>
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<tr>
<td>2540522</td>
<td>Analytical CRM</td>
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<td>A. Geyer-Schulz</td>
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<tr>
<td>2540520</td>
<td>Operative CRM</td>
<td>2/1</td>
<td>W</td>
<td>4,5</td>
<td>A. 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 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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes

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 [WI3BWLISM4] 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, ...).

Workload

The total workload for this module is approximately 270 hours. For further information see German version.
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/.
Module: Specialization in Customer Relationship Management [WI3BWLISM5]

Coordination: A. Geyer-Schulz
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

<table>
<thead>
<tr>
<th>ID</th>
<th>Course</th>
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<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tr>
<td>2540522</td>
<td>Analytical CRM</td>
<td>2/1</td>
<td>S</td>
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<td>W</td>
<td>4,5</td>
<td>A. Geyer-Schulz</td>
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<tr>
<td>26240</td>
<td>Competition in Networks</td>
<td>2/1</td>
<td>W</td>
<td>4,5</td>
<td>K. Mittusch</td>
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<tr>
<td>2595466</td>
<td>eServices</td>
<td>2/1</td>
<td>S</td>
<td>4,5</td>
<td>C. Weinhardt, H. Fromm</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.
- It is only possible to choose this module in combination with the module CRM and Servicemanagement [WI3BWLISM4]. 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.

Learning Outcomes
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 statistical methods (e.g. cluster analysis, regression analysis, stochastic models, . . .) are presented which help in computing suitable key performance indicators or which support decision-making.

Regarding the operative part, we emphasize the design of operative CRM processes. This includes the modelling, implementation, introduction and change, as well as the analysis and evaluation of operative CRM processes. Petri nets and their extensions are the scientific foundation of process modelling. The link of Petri nets to process models used in industry as e.g. UML activity diagrams is presented. In addition, a framework for process innovation which aims at a radical improvement of key business processes is introduced. The following application areas of operative CRM processes are presented and discussed:
• Strategic marketing processes
• Operative marketing processes (campaign management, permission marketing, . . .)
• Customer service processes (sales force management, field services, call center management, . . .)

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

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 the cycle and on the exams can be found on http://www.em.uni-karlsruhe.de/studies/.
Module: Design, Construction and Sustainability Assessment of Buildings [WI3BWLOOW1]

Coordination: T. Lützkendorf
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

<table>
<thead>
<tr>
<th>ECTS Credits</th>
<th>Cycle</th>
<th>Duration</th>
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Courses in module

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<th>ID</th>
<th>Course</th>
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<th>Term</th>
<th>CP</th>
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<tr>
<td>26404w</td>
<td>Design and Construction of Buildings</td>
<td>2/1</td>
<td>W</td>
<td>4,5</td>
<td>T. Lützkendorf</td>
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<tr>
<td>2585404/2586404</td>
<td>Sustainability Assessment of Buildings</td>
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<td>S</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

Recommendations
The combination with the module Real Estate Management [WI3BWLOOW2] 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.

Learning Outcomes
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.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Real Estate Management [WI3BWLOOW2]

**Coordination:** T. Lützkendorf  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Business Administration

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<th>ECTS Credits</th>
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**Courses in module**

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<tr>
<td>26400w</td>
<td>Real Estate Management I</td>
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<td>2585400/2586400</td>
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<td>2/2</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 module “Business Administration” [WI1BW1]. For exceptions see § 17 Abs. 6 SPO.

**Recommendations**

The combination with the module Design Constructions and Assessment of Green Buildings [WI3BWLOOW1] 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.

**Learning Outcomes**

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.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Foundations of Marketing [WI3BWLMAR]

Coordination: M. Klarmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Business Administration

ECTS Credits | Cycle | Duration
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9 | Every term | 1

Courses in module

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<th>ID</th>
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<th>Term</th>
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<td>2572177</td>
<td>Brand Management</td>
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<td>W</td>
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<tr>
<td>2572158</td>
<td>Services Marketing and B2B Marketing</td>
<td>2</td>
<td>W</td>
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<td>M. Klarmann</td>
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<td>2572155</td>
<td>International Marketing</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 module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO. The course Marketing Mix is compulsory and must be examined.

Learning Outcomes
The aim of this module is to prepare the students properly for tasks in a marketing or sales department. Especially technical oriented companies choose engineers with technical knowledge and understanding for marketing and sales.

Students
- know the most important concepts, approaches, and theories of the marketing mix (product management, price management, communication management and sales management)
- can make decisions about current and future products (innovation management and management of established products; e.g. conjoint analysis)
- know how customers perceive brands and how to influence that
- comprehend how customers respond to prices (e.g. price-demand function)
- know how to determine prices based on conceptual and quantitative considerations
- know the basics of price differentiation
- are familiar with the instruments of communication and are able to design them accurately
- know how to allocate the communication budget
- know how to target consumers via market segmentation
- know how to position a product
- know how to analyze the significance and satisfaction of a customer
- know how create a relationship to the customer and to the retailer
- are familiar with the particularities in specific marketing contexts (Business-to-Business Marketing, Marketing of Services, International Marketing)

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”.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Remarks
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).
Module: Management of public- and private-sector organizations [WI3BWL1WW1]

**Coordination:** B. Wigger, N. Edwards

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Business Administration

<table>
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<tr>
<th>ECTS Credits</th>
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### Courses in module

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<td>2577902</td>
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<td>2/0 W</td>
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<td>2560132</td>
<td>Introduction to Public Management</td>
<td>2 S</td>
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<td>2560133</td>
<td>Case Studies in Public Management</td>
<td>1 S</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), 1-3 SPO) for each individual course in 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 for the module is calculated as weighted average of the individual grades for all courses. Individual course grades are weighted according to the number of credits (LPs) for that course. The final grade is then rounded-off to the first decimal place.

### Conditions

Successful passing of the module “Business Administration” [WI1BWL1]. For exceptions see § 17 Abs. 6 SPO.

Each course in this module is a compulsory element of the entire module; therefore, a passing grade in each course is required in order to receive credit for completion of the module.

Both the lecture „Introduction to Public Management“ and the course „Case Studies in Public Management“ must be taken at the same time.

### Recommendations

A good proficiency in the English language (written and oral).

### Learning Outcomes

The aim of the module is to provide students with a comprehensive understanding of management in private and public sector organizations, as well as in the provision of public services. Topics covered in the module include the following: strategic management; marketing; financial management; contracting for public service provision; information and communication technologies; human resource management; performance, quality and process management; change management; internal control of organizational processes; auditing and controlling; and, ideal-typical organizational forms.

In addition to the two lectures, the module includes a third course, “Case Studies in Public Management”, in which student achievement of learning goals is realized by the use of case studies. This course utilizes a problem-based learning (PBL) format, which offers students the opportunity to apply knowledge acquired both in the accompanying lectures as well as through independent research, in solving contemporary problems in public management. Students actively participate in the course and contribute to the overall learning experience.

Please also refer to the learning goals related to the individual courses in the module.

### Content

Topics covered in the module include, but are not limited to, the following: Strategic management; marketing; financial management; contracting for public service provision; information and communication technologies; human resource management; performance, quality and process management; change management; internal control of organizational processes; auditing and controlling; and, ideal-typical organizational forms.

### Workload

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

Module: Public Finance [WI3VWL9]

**Coordination:** B. Wigger

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Economics

### ECTS Credits

<table>
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<th>Responsible Lecturer(s)</th>
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<tbody>
<tr>
<td>2560120</td>
<td>Public Revenues</td>
<td>2/1</td>
<td>S</td>
<td>4,5</td>
<td>B. Wigger, Assistenten</td>
</tr>
<tr>
<td>2561129</td>
<td>Specific Aspects in Taxation</td>
<td>3</td>
<td>W</td>
<td>4,5</td>
<td>B. Wigger, Armin Bader</td>
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<tr>
<td>2561126</td>
<td>Monetary and Financial Policy</td>
<td>3</td>
<td>W</td>
<td>4,5</td>
<td>B. Wigger, J. Nagel</td>
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<tr>
<td>2560131</td>
<td>Introduction to Public Finance</td>
<td>3</td>
<td>W</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. 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 module Economics [WI1VWL]. For exceptions see § 17 Abs. 6 SPO.

### Recommendations

It is recommended to attend the course Spezielle Steuerlehre [2561129] after having completed the course Öffentliche Einnahmen [2560120].

### Learning Outcomes

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.

### Workload

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

### Remarks

See German version.
Module: Economic Policy I [WI3VWL10]

Coordination: I. Ott
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Economics

ECTS Credits: 9
Cycle: Every term
Duration: 1

Courses in module

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<td>W</td>
<td>4.5</td>
<td>K. Mitsch</td>
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<td>2560280</td>
<td>Basic Principles of Economic Policy</td>
<td>2/1</td>
<td>S</td>
<td>4.5</td>
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<td>Public Revenues</td>
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<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. 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 module Economics [WI1VWL]. For exceptions see § 17 Abs. 6 SPO. The course “Basic Principles of Economic Policy” is compulsory and must be examined.

Recommendations
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014].

Learning Outcomes
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
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.

Remarks
The module is added in SS 2011 and replaces the module International Economics [WW3VWL3]. The lecture International Economics will be held until winter 2012/13. Examinations are offered until winter 2013/14.
**Module: Introduction to Public Finance and Public Management [WI3VWL11]**

**Coordination:** B. Wigger, N. Edwards  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Economics

### ECTS Credits  
Cycle: Every term  
Duration: 2

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<th>Hours per week C/E/T</th>
<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tr>
<td>2560131</td>
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<td>B. Wigger</td>
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<tr>
<td>2560132</td>
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</tr>
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</table>

**Learning Control / Examinations**

The final grade for the module is determined by means of a written exam and the grades on the other assignments. The written exam encompasses all material covered in the individual courses included in this module. The exam is offered every summer semester. The ratio of the final grade for the courses is as follows: 55% written final exam and 45% other assignments (both written and oral).

A re-sit exam (written exam) will be offered during the first week of the following winter semester, for which participation is obligatory for all students who failed the exam on their first attempt. Only students who took the first exam will be allowed to participate in the re-sit exam. Only in exceptional circumstances may the re-sit exam be taken as an oral exam rather than as a written exam.

**Conditions**

Successful passing of the module Economics [WI1VWL]. For exceptions see § 17 Abs. 6 SPO. Each course in this module is a compulsory element of the entire module. Both the lecture „Introduction to Public Management“ and the course „Case Studies in Public Management“ must be taken at the same time.

**Recommendations**

A good proficiency in the English language (written and spoken).

**Learning Outcomes**

The module *Introduction to Public Finance and Public Management* is comprised of three courses, *Introduction to Public Finance*, *Introduction to Public Management*, and *Case Studies in Public Management*. This multidisciplinary module aims to provide students with an understanding of the complexities surrounding the economic role of the state in a market economy. While the course *Introduction to Public Finance* deals with issues such as the determination of the appropriate size and scope of the state as economic actor, the course *Introduction to Public Management* then looks at the management of the public sector organizations that are tasked with executing the resulting government programs. There are numerous topics on which the two courses overlap and converge, with the result that students are able to analyze single issues by applying theory from several disciplines; namely, economics, management and organization studies. Finally, the course *Case Studies in Public Management* offers students the opportunity to evaluate and synthesize the material learned in the lecture courses and then apply it in solving contemporary problems in public sector management and governance.

Please also refer to the learning goals related to the individual courses in the module.

**Content**

Topics covered in the module include, but are not limited to, the following: welfare economics; public choice theory; market failure; collective action problems; Weber's theory of bureaucracy; the influence of politics on the management of public sector organizations; strategic management and marketing in public sector organizations; modes of public service provision; human resource management in public sector organizations; and performance, quality and process management in public sector organizations.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Economic Theory [WI3VWL12]

Coordination: C. Puppe
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Economics

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### Courses in module

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<td>2520525</td>
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<td>2520517</td>
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<td>M. Hillebrand, K. Mitusch</td>
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<tr>
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<tr>
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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 module Economics [WI1VWL]. For exceptions see § 17 Abs. 6 SPO.

### Learning Outcomes

See German version.

### Content

### Workload

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Applied Microeconomics [WI3VWL13]

Coordination: P. Reiss
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Economics

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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 module Economics [WI1VWL]. For exceptions see § 17 Abs. 6 SPO.

Recommendations
Completion of the module Economics [WW1VWL] is assumed.

Learning Outcomes
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.

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

Remarks
The course „Introduction into Game Theory“ was known as „Game Theory I“ earlier.
6.3 Informatics

Module: Emphasis Informatics [WI3INFO1]

Coordination: H. Schmeck, A. Oberweis, D. Seese, R. Studer
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Informatics

<table>
<thead>
<tr>
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<td>Platzhalter</td>
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<td>2/1</td>
<td>W/S</td>
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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 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 seperately.

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.

Conditions
Successful passing of the module Introduction to Informatics [WI1INFO]. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes
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.
Module: Electives in Informatics [WI3INFO2]

**Coordination:** H. Schmeck, A. Oberweis, D. Seese, R. Studer

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Informatics

<table>
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**Courses in module**

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<td>S</td>
<td>5</td>
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<td>2/1</td>
<td>S</td>
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**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 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.

**Conditions**
Successful passing of the module Introduction to Informatics [WI1INFO]. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**
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.
6.4 Operations Research

Module: Applications of Operations Research [WI3OR5]

Coordination: S. Nickel
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Operations Research

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Courses in module

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<th>CP</th>
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<tr>
<td>2550488</td>
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<td>2550490</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 module Introduction to Operations Research [WI1OR]. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes

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

Remarks
The planned lectures and courses for the next three years are announced online.
Module: Methodical Foundations of OR [WI3OR6]

**Coordination:** O. Stein  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Operations Research

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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 module **Introduction to Operations Research** [WI1INFO]. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**  
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.

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

**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.
Module: Stochastic Methods and Simulation [WI3OR7]

Coordination: K. Waldmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Operations Research

<table>
<thead>
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<th>Cycle</th>
<th>Duration</th>
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Courses in module

<table>
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<tr>
<th>ID</th>
<th>Course</th>
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<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tr>
<td>2550679</td>
<td>Markov Decision Models I</td>
<td>2/1/2</td>
<td>W</td>
<td>5</td>
<td>K. Waldmann</td>
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<tr>
<td>2550682</td>
<td>Markov Decision Models II</td>
<td>2/1/2</td>
<td>S</td>
<td>4,5</td>
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<tr>
<td>2550662</td>
<td>Simulation I</td>
<td>2/1/2</td>
<td>W/S</td>
<td>4,5</td>
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<tr>
<td>2550665</td>
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<td>W/S</td>
<td>4,5</td>
<td>K. Waldmann</td>
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<tr>
<td>2550111</td>
<td>Nonlinear Optimization I</td>
<td>2/1</td>
<td>S</td>
<td>4,5</td>
<td>O. Stein</td>
</tr>
<tr>
<td>2550488</td>
<td>Tactical and Operational Supply Chain</td>
<td>2/1</td>
<td>S</td>
<td>4,5</td>
<td>S. 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 module Introduction to Operations Research [WI1OR]. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes
The student knows and understands stochastic relationships and has a competent knowledge in modelling, analyzing and optimizing stochastic systems in economics and engineering.

Content
Topics overview:
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.

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

Remarks
The planned lectures and courses for the next two years are announced online (http://www.ior.kit.edu/)
6.5 Engineering Sciences

Module: Automotive Engineering [WI3INGMB5]

Coordination: F. Gauterin
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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<th>ECTS Credits</th>
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Courses in module

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<tr>
<td>2113805</td>
<td>Automotive Engineering I</td>
<td>4</td>
<td>W</td>
<td>6</td>
<td>F. Gauterin, H. Unrau</td>
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<tr>
<td>2114835</td>
<td>Automotive Engineering II</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>F. Gauterin, H. Unrau</td>
</tr>
<tr>
<td>2115817</td>
<td>Project Workshop: Automotive Engineering</td>
<td>3</td>
<td>W/S</td>
<td>4.5</td>
<td>F. Gauterin</td>
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<tr>
<td>2113814</td>
<td>Fundamentals for Design of Motor-Vehicles Bodies I</td>
<td>1</td>
<td>W</td>
<td>1.5</td>
<td>H. Bardehle</td>
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<tr>
<td>2114840</td>
<td>Fundamentals for Design of Motor-Vehicles Bodies II</td>
<td>1</td>
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<tr>
<td>2114093</td>
<td>Fluid Technology</td>
<td>2</td>
<td>W</td>
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<td>M. Geimer, M. Scherer</td>
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<td>2114092</td>
<td>BUS-Controls</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>M. Geimer</td>
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<td>2113809</td>
<td>Automotive Engineering I</td>
<td>4</td>
<td>W</td>
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<td>F. Gauterin, M. Gießler</td>
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<tr>
<td>2114855</td>
<td>Automotive Engineering II</td>
<td>2</td>
<td>S</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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

Recommendations

Learning Outcomes
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.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Handling Characteristics of Motor Vehicles [WI3INGMB6]

**Coordination:** F. Gauterin  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Engineering Science

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### Courses in module

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<td>2113806</td>
<td>Vehicle Comfort and Acoustics I</td>
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<td>W</td>
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<tr>
<td>2114825</td>
<td>Vehicle Comfort and Acoustics II</td>
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<td>2113807</td>
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<td>H. Unrau</td>
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<td>2114838</td>
<td>Handling Characteristics of Motor Vehicles II</td>
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<tr>
<td>2113816</td>
<td>Vehicle Mechatronics I</td>
<td>2</td>
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<td>W/S</td>
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<td>F. Gauterin</td>
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<td>2114850</td>
<td>Global vehicle evaluation within virtual road test</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>B. Schick</td>
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<tr>
<td>2114856</td>
<td>Vehicle Ride Comfort &amp; Acoustics I</td>
<td>2</td>
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<tr>
<td>2114857</td>
<td>Vehicle Ride Comfort &amp; Acoustics II</td>
<td>2</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 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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

### Recommendations


### Learning Outcomes

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.

### Workload

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Emphasis in Fundamentals of Engineering [WI3INGMB8]

Coordination: M. Hoffmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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Courses in module

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<tr>
<td>23224</td>
<td>Electrical Engineering II</td>
<td>2/1</td>
<td>S</td>
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<td>2126782</td>
<td>Materials Science II for Business Engineers</td>
<td>2/1</td>
<td>S</td>
<td>5</td>
<td>M. Hoffmann</td>
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<tr>
<td>2162276</td>
<td>Introduction to Engineering Mechanics II : Dynamics</td>
<td>2</td>
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<td>A. 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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes
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.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Emphasis Materials Science [WI3INGMB9]

Coordination: M. Hoffmann
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

<table>
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<th>ID</th>
<th>Course</th>
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<th>Responsible Lecturer(s)</th>
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<td>2194643</td>
<td>Constitution and Properties of Wear resistant materials</td>
<td>2</td>
<td>S</td>
<td>4</td>
<td>S. Ulrich</td>
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<tr>
<td>2125757</td>
<td>Introduction to Ceramics</td>
<td>3/1</td>
<td>W</td>
<td>6</td>
<td>M. Hoffmann</td>
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<td>2126784</td>
<td>Functional Ceramics</td>
<td>2</td>
<td>S</td>
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<td>M. Hoffmann, M. Bäurer</td>
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<td>2174756</td>
<td>Systematic Materials Selection</td>
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<td>S</td>
<td>5</td>
<td>J. Hoffmeister</td>
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<tr>
<td>2181612</td>
<td>Physical basics of laser technology</td>
<td>2/1</td>
<td>W</td>
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<td>J. Schneider</td>
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<td>2173590</td>
<td>Polymer Engineering I</td>
<td>2</td>
<td>W</td>
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<td>2174596</td>
<td>Polymer Engineering II</td>
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<td>Failure of Structural Materials: Fatigue and Creep</td>
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<td>4</td>
<td>O. Kraft, P. Gumbsch, P. Gruber</td>
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<td>2181711</td>
<td>Failure of structural materials: deformation and fracture</td>
<td>2</td>
<td>W</td>
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<td>P. Gumbsch, O. Kraft, D. Weygand</td>
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<td>2126749</td>
<td>Advanced powder metals</td>
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<td>Structural Ceramics</td>
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<td>2125763</td>
<td>Structural and phase analysis</td>
<td>2</td>
<td>W</td>
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<td>S. Wagner</td>
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Learning Control / Examinations
The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The 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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

Recommendations
It is recommended to have natural science basic knowledge.

Learning Outcomes
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.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Introduction to Technical Logistics [WI3INGMB13]

Coordination: K. Furmans  
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)  
Subject: Engineering Science

<table>
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<th>Responsible Lecturer(s)</th>
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<tr>
<td>2117051</td>
<td>Material flow in logistic systems</td>
<td>3/1</td>
<td>W</td>
<td>6</td>
<td>K. Furmans</td>
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<tr>
<td>2118097</td>
<td>Warehousing and distribution systems</td>
<td>2</td>
<td>S</td>
<td>4</td>
<td>M. Schwab, J. Weiblen</td>
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<td>2117056</td>
<td>Airport logistics</td>
<td>2</td>
<td>W</td>
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<td>A. Richter</td>
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<td>2118085</td>
<td>Automotive Logistics</td>
<td>2</td>
<td>S</td>
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<td>2118089</td>
<td>Application of technical logistics in sorting- and</td>
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<td>S</td>
<td>4</td>
<td>J. Föller</td>
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<td>distribution technology</td>
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<td>2118094</td>
<td>Information Systems in Logistics and Supply Chain</td>
<td>2</td>
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<td>2117500</td>
<td>Energy efficient intralogistic systems</td>
<td>2</td>
<td>W</td>
<td>4</td>
<td>F. Schönung</td>
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<td>2117095</td>
<td>Basics of Technical Logistics</td>
<td>3/1</td>
<td>W</td>
<td>6</td>
<td>M. Mittwollen, Madzharov</td>
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<tr>
<td>2117096</td>
<td>Elements of Technical Logistics</td>
<td>3/1</td>
<td>W</td>
<td>6</td>
<td>M. Mittwollen, Madzharov</td>
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<td>2117097</td>
<td>Elements of Technical Logistics and Project</td>
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<td>W</td>
<td>6</td>
<td>M. Mittwollen, Madzharov</td>
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<tr>
<td>2117064</td>
<td>Application of technical logistics in modern crane</td>
<td>2</td>
<td>W</td>
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<td>M. Golder</td>
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<td>2118087</td>
<td>Selected Applications of Technical Logistics</td>
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<td>2118088</td>
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<td>2500005</td>
<td>Production and Logistics Controlling</td>
<td>2</td>
<td>W</td>
<td>3</td>
<td>H. Wlcek</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.

To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the IFL. The term paper may not be convalidated in the seminar module.

Conditions
Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

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.

Learning Outcomes
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.
Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Vehicle Development [WI3INGMB14]

**Coordination:** F. Gauterin
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)
**Subject:** Engineering Science

<table>
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### Courses in module

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<tr>
<td>2115817</td>
<td>Project Workshop: Automotive Engineering</td>
<td>3</td>
<td>W/S</td>
<td>4,5</td>
<td>F. Gauterin</td>
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<tr>
<td>2113816</td>
<td>Vehicle Mechatronics I</td>
<td>2</td>
<td>W</td>
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<tr>
<td>2113812</td>
<td>Fundamentals in the Development of Commercial Vehicles I</td>
<td>1</td>
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<tr>
<td>2114842</td>
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<td>2114845</td>
<td>Basics and Methods for Integration of Tires and Vehicles</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>G. Leister</td>
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<tr>
<td>2114095</td>
<td>Simulation of Coupled Systems</td>
<td>2</td>
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<td>3</td>
<td>M. 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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Recommendations**

**Learning Outcomes**
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.

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Mobile Machines [WI3INGMB15]

**Coordination:** M. Geimer  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Engineering Science

<table>
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### Courses in module

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<tr>
<td>2114093</td>
<td>Fluid Technology</td>
<td>2</td>
<td>W</td>
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<td>Simulation of Coupled Systems</td>
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<td>3</td>
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<tr>
<td>2114092</td>
<td>BUS-Controls</td>
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<td>2114073</td>
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<td>S</td>
<td>1,5</td>
<td>J. 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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Recommendations**

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

**Learning Outcomes**

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 [WI3INGMB15] 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.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Combustion Engines I [WI3INGMB34]

Cooordination: H. Kubach
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

<table>
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<tr>
<th>ID</th>
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<tr>
<td>2133103</td>
<td>Fundamentals of Combustion Engines I</td>
<td>2/1</td>
<td>W</td>
<td>5</td>
<td>H. Kubach, T. Koch</td>
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<tr>
<td>2133121</td>
<td>Energy Conversion and Increased Efficiency in Internal Combustion Engines</td>
<td>2</td>
<td>W</td>
<td>4</td>
<td>T. Koch, H. Kubach</td>
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</table>

Learning Control / Examinations
The assessment consists of an oral exam (60 min) taking place in the recess period (according to §4 (2), 2 of the examination regulation). The exam takes place in every semester. Reexaminations are offered at every ordinary examination date.

Conditions
Successful passing of the engineering modules of the core programme. For exceptions see § 17 Abs. 6 SPO.

Recommendations
None.

Learning Outcomes
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

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Combustion Engines II [WI3INGMB35]

**Coordination:** H. Kubach

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Engineering Science

**ECTS Credits**

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**Courses in module**

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<tr>
<td>2134131</td>
<td>Fundamentals of Combustion Engines II</td>
<td>2/1</td>
<td>S</td>
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<td>H. Kubach, T. Koch</td>
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<tr>
<td>2133108</td>
<td>Fuels and Lubricants for Combustion Engines</td>
<td>2</td>
<td>W</td>
<td>4</td>
<td>B. Kehrwald</td>
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<tr>
<td>2134138</td>
<td>Fundamentals of catalytic exhaust gas aftertreatment</td>
<td>2</td>
<td>S</td>
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<td>E. Lox</td>
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<tr>
<td>2134134</td>
<td>Analysis tools for combustion diagnostics</td>
<td>2</td>
<td>S</td>
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<td>U. Wagner</td>
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<td>2134137</td>
<td>Engine measurement techniques</td>
<td>2</td>
<td>S</td>
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<td>2134141</td>
<td>Gas Engines</td>
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<tr>
<td>2134150</td>
<td>Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines</td>
<td>2</td>
<td>S</td>
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<td>M. Gohl</td>
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<tr>
<td>2134139</td>
<td>Model based Application Methods</td>
<td>2</td>
<td>S</td>
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<td>F. Kirschbaum</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 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 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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Recommendations**
Basic skills in thermodynamics are recommended.

**Learning Outcomes**
See courses.

**Content**

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Product Lifecycle Management [WI3INGMB21]

Coordination: J. Ovtcharova
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits: 9
Cycle: Every term
Duration: 1

Courses in module

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<th>Course</th>
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<tr>
<td>2121350</td>
<td>Product Lifecycle Management</td>
<td>3/1</td>
<td>W</td>
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<td>J. Ovtcharova</td>
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<tr>
<td>2122387</td>
<td>Computer Integrated Planning of New Products</td>
<td>2</td>
<td>S</td>
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<td>2122376</td>
<td>PLM for product development in mechatronics</td>
<td>2/0</td>
<td>S</td>
<td>4</td>
<td>M. Eigner</td>
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<tr>
<td>2122014</td>
<td>Information Engineering</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>J. Ovtcharova, J. Ovtcharova</td>
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</table>

Learning Control / Examinations
The assessment is carried out as a written exam about Product Lifecycle Management (90 min) (according to Section 4(2), 1 of the examination regulation) and a oral exam (ca. 30 min.) about another lecture (according to Section 4(2), 2 of the examination regulation), 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 made up of the grade for the written examination (67%) and the grade for the oral examination (33%).

Conditions
The course Product Lifecycle Management [2121350] is compulsory and has to be passed.
Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes
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.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Specialization in Production Engineering [WI3INGMB22]

Coordinator: V. Schulze
Degree Programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

**ECTS Credits**

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**Courses in module**

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<tr>
<td>2149667</td>
<td>Quality Management</td>
<td>2 W</td>
<td>4</td>
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<td>G. Lanza</td>
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<tr>
<td>2149669</td>
<td>Materials and Processes for Body Lightweight Construction in the Automotive Industry</td>
<td>2 W</td>
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<td>D. Steegmüller, S. Kienzle</td>
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<tr>
<td>2150681</td>
<td>Metal Forming</td>
<td>2 S</td>
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<td>2150683</td>
<td>Control Technology</td>
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<td>2149655</td>
<td>Gear Cutting Technology</td>
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<td>2149001</td>
<td>Production Technology and Management in Automotive</td>
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<td>2150601</td>
<td>Integrative Strategies in Production and Development of High Performance Cars</td>
<td>2 S</td>
<td>4</td>
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<td>K. Schlichtenmayer</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 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. To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the wbk. The term paper may not be convalidated in the seminar module.

**Conditions**

Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**

The students

- are able to apply the methods of production science to new problems.
- are able to analyze and evaluate the suitability of the methods, procedures and techniques for a specific problem.
- are able to use their knowledge target-oriented to achieve an efficient production technology.
- are able to analyze new situations and choose methods of production science target-oriented based on the analyses, as well as justifying their selection.
- are able to describe and compare complex production processes exemplarily.

**Content**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Manufacturing Technology [WI3INGMB23]

Coordination: V. Schulze
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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Courses in module

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<td>4/2</td>
<td>W</td>
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<td>V. Schulze, F. Zanger</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 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.

To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the wbk. The term paper may not be convalidated in the seminar module.

Conditions
Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes
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: Integrated Production Planning [WI3INGMB24]

Coordination: V. Schulze, Gisela Lanza
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

<table>
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Courses in module

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<tr>
<td>2150660</td>
<td>Integrated production planning</td>
<td>4/2</td>
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<td>9</td>
<td>G. Lanza</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 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.

To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the wbk. The term paper may not be convalidated in the seminar module.

Conditions

Successful passing of the engineering modules of the core program. For exceptions see § 17 Abs. 6 SPO.

Learning Outcomes

The students

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

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: Rail System Technology [WI3INGMB25]

Coorodination: P. Gratzfeld
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

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Courses in module

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<td>2115919</td>
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<td>P. Gratzfeld</td>
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<tr>
<td>2115995</td>
<td>Project Management in Rail Industry</td>
<td>2</td>
<td>W</td>
<td>3</td>
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<td>2115996</td>
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<td>2</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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

Recommendations
The lectures can be taken simultaneously.

Learning Outcomes
- 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)

Workload
1. Regular attendance: 63 hours
2. Self-study: 63 hours
3. Exam and preparation: 144 hours
Module: Machine Tools and Industrial Handling [WI3INGMB32]

**Coordination:** J. Fleischer  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Engineering Science

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<tr>
<td>9</td>
<td>Every 2nd term, Winter Term</td>
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### Courses in module

<table>
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<tr>
<th>ID</th>
<th>Course</th>
<th>Hours per week</th>
<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
</tr>
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<tbody>
<tr>
<td>2149902</td>
<td>Machine Tools and Industrial Handling</td>
<td>4/2</td>
<td>W</td>
<td>9</td>
<td>J. Fleischer</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 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. To improve the overall grade of the module up to one grading scale (0.3) there might be taken an optional term paper in the field of the wbk. The term paper may not be convalidated in the seminar module.

**Conditions**  
Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**  
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.

**Workload**  
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Microsystem Technology [WI3INGMBIMT1]

Coordination: V. Saile
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

<table>
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<tr>
<th>ECTS Credits</th>
<th>Cycle</th>
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Courses in module

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<th>CP</th>
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<tr>
<td>2141861</td>
<td>Introduction to Microsystem Technology I</td>
<td>2</td>
<td>W</td>
<td>3</td>
<td>A. Guber</td>
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<tr>
<td>2142874</td>
<td>Introduction to Microsystem Technology II</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>A. Guber</td>
</tr>
<tr>
<td>2143875</td>
<td>Introduction to Microsystem Technology - Practical Course</td>
<td>2</td>
<td>W/S</td>
<td>3</td>
<td>A. Last</td>
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<tr>
<td>2142890</td>
<td>Physics for Engineers</td>
<td>2/2</td>
<td>S</td>
<td>6</td>
<td>P. Gumbsch, A. Nesterov-Müller, D. Weygand</td>
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<tr>
<td>2143892</td>
<td>Selected Topics on Optics and Microoptics for Mechanical Engineers</td>
<td>2</td>
<td>W/S</td>
<td>3</td>
<td>T. Mappes</td>
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<tr>
<td>2142883</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine II</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>A. Guber</td>
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<tr>
<td>2142879</td>
<td>BioMEMS - Microsystems Technologies for Life-Sciences and Medicine III</td>
<td>2</td>
<td>S</td>
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<td>A. Guber</td>
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<tr>
<td>2142881</td>
<td>Microactuators</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>M. Kohl</td>
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<tr>
<td>2141865</td>
<td>Novel Actuators and Sensors</td>
<td>2</td>
<td>W</td>
<td>3</td>
<td>M. Kohl, M. Sommer</td>
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<tr>
<td>2143876</td>
<td>Nanotechnology with Clusterbeams</td>
<td>2</td>
<td>W/S</td>
<td>3</td>
<td>J. Gspann</td>
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<td>2142140</td>
<td>Bionics for Engineers and Natural Scientists</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>H. Hölscher</td>
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<tr>
<td>23486 / 23487</td>
<td>Optoelectronic Components</td>
<td>2 / 1</td>
<td>S</td>
<td>4.5</td>
<td>W. Freude</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 engineering modules of the core program. For exceptions see § 17 Abs. 6 SPO.
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.

Learning Outcomes
- 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.

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

Remarks
If you have any questions concerning the module, please contact Prof. Dr. Andreas E. Guber.
Module: Control Engineering [WI3INGETIT2]

**Coordination:** M. Kluwe, S. Hohmann
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)
**Subject:** Engineering Science

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**Courses in module**

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<tr>
<th>ID</th>
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<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tbody>
<tr>
<td>23168</td>
<td>Modelling and Identification</td>
<td>2/1</td>
<td>W</td>
<td>4,5</td>
<td>M. Kluwe, S. Hohmann</td>
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<tr>
<td>23155</td>
<td>System Dynamics and Control Engineering</td>
<td>2/1</td>
<td>S</td>
<td>4,5</td>
<td>M. Kluwe, S. Hohmann</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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Recommendations**
Knowledge of integral transformations is assumed. There it is recommended to attend the courses Complex Analysis and Integral Transformations beforehand.

**Learning Outcomes**
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.

**Workload**
The total workload for this module is approximately 270 hours. For further information see German version.
Module: Power Networks [WI3INGETIT3]

**Coordination:** T. Leibfried, B. Hoferer  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Engineering Science

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Courses in module

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<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tbody>
<tr>
<td>23391/23393</td>
<td>Systems for Electrical Energy</td>
<td>2/1</td>
<td>S</td>
<td>4.5</td>
<td>T. Leibfried</td>
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<tr>
<td>23371/23373</td>
<td>Power Network Analysis</td>
<td>2/2</td>
<td>W</td>
<td>6</td>
<td>T. Leibfried</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**
Successful passing of the engineering modules of the core programme. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**
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: Energy Generation and Network Components [WI3INGETIT4]

**Coordination:** T. Leibfried, B. Hoferer

**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)

**Subject:** Engineering Science

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### Courses in module

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<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tbody>
<tr>
<td>23356</td>
<td>Electric Power Generation &amp; Power Grid</td>
<td>2/0</td>
<td>W</td>
<td>3</td>
<td>B. Hoferer</td>
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<tr>
<td>23390</td>
<td>Engineering, Design and Operation of Power Transformers</td>
<td>2/0</td>
<td>S</td>
<td>3</td>
<td>M. Schäfer</td>
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<tr>
<td>23382</td>
<td>Technique of Electrical Installation</td>
<td>2/0</td>
<td>S</td>
<td>3</td>
<td>A. Kühner</td>
</tr>
<tr>
<td>23396</td>
<td>Automation of Power Grids</td>
<td>2/0</td>
<td>S</td>
<td>3</td>
<td>R. Eichler</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** [WI3INGETIT3]. The module is passed only after the final partial exam of **Power Networks** is additionally passed. Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

### Learning Outcomes

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: Mobility and Infrastructure [W3INGBGU1]

**Coordination:** R. Roos  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Engineering Science

<table>
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**Courses in module**

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<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tbody>
<tr>
<td>19027</td>
<td>Fundamentals of Transportation Planning and Traffic Engineering</td>
<td>2/0</td>
<td>S</td>
<td>3</td>
<td>P. Vortisch, M. Kagerbauer</td>
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<tr>
<td>19026</td>
<td>Design Basics in Highway Engineering</td>
<td>2/0</td>
<td>S</td>
<td>3</td>
<td>R. Roos</td>
</tr>
<tr>
<td>19028</td>
<td>Spatial Planning and Planning Law</td>
<td>2/0</td>
<td>S</td>
<td>3</td>
<td>D. Engelke, Brester</td>
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**Learning Control / Examinations**

The assessment of the module is carried out as a general written examination (150 minutes) according to §4(2), 1 of the examination regulation. The exam is offered in each semester as well as the re-examination. In case of failing or to improve the examination grade an additional oral examination (according to §4(2), 2 of the examination regulation) is offered in the same examination period. The overall grade of the module corresponds to the grade of the written examination or the average of the marks for the written and the oral assessment.

**Conditions**

Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Learning Outcomes**

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

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Fundamentals of construction [WI3INGBGU3]

Coordination: S. Haghsheno
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits 9
Cycle Every term
Duration 2

Courses in module

<table>
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<tr>
<th>ID</th>
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<th>CP</th>
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<tbody>
<tr>
<td>0170409</td>
<td>Construction Technology</td>
<td>4</td>
<td>S</td>
<td>6</td>
<td>S. Haghsheno, S. Gentes</td>
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<tr>
<td>0170106</td>
<td>Project Management</td>
<td>2</td>
<td>W</td>
<td>3</td>
<td>S. Haghsheno, H. Schneider</td>
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</table>

Learning Control / Examinations
See German version.

Conditions
Successful passing of the engineering modules of the core programme. For exceptions see § 17 Abs. 6 SPO.

Recommendations
None.

Learning Outcomes
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.

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

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.

**Coordination:** M. Weigel  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  
**Subject:** Engineering Science

<table>
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<th>ECTS Credits</th>
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**Courses in module**

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<th>ID</th>
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<th>CP</th>
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<tr>
<td>0170517</td>
<td>Basics of Track Guided Transport Systems</td>
<td>2</td>
<td>W</td>
<td>3</td>
<td>E. Hohnecker</td>
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<tr>
<td>6234801</td>
<td>Operation</td>
<td>2</td>
<td>S</td>
<td>3</td>
<td>E. Hohnecker</td>
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<tr>
<td>6234802</td>
<td>Facilities and Rolling Stock</td>
<td>1/1</td>
<td>S</td>
<td>3</td>
<td>E. Hohnecker</td>
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**Learning Control / Examinations**

The assessment is carried out as a general written module exam according to Section 4 Abs. 2, Nr. 1 of the examination regulation. The module exam has a duration of 90 min. The exam is offered each semester. The re-examination is offered upon prior agreement with the interested participants and not later than the next regular examination date. The overall grade of the module is the grade for the exam.

**Conditions**

All courses are obligatory. Successful passing of the engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.

**Recommendations**

None.

**Learning Outcomes**

See German version.

**Content**

See courses.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Understanding and Prediction of Disasters 1 [W3INGINTER6]

Coordination: M. Kunz
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

<table>
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Courses in module

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<th>Hours per week</th>
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<th>CP</th>
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<tbody>
<tr>
<td>2501111</td>
<td>Climatology</td>
<td>3/1</td>
<td>S</td>
<td>5,5</td>
<td>P. Braesicke</td>
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<td>57535</td>
<td>Meteorological Natural Hazards</td>
<td>2</td>
<td>S</td>
<td>3,5</td>
<td>M. Kunz</td>
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<tr>
<td>GEOD-BFB-1</td>
<td>Remote Sensing</td>
<td>3/2/1</td>
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<td>6</td>
<td>Hinz, Weidner</td>
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<td>20241/42</td>
<td>Remote Sensing Systems</td>
<td>1/1</td>
<td>S</td>
<td>2</td>
<td>S. Hinz, U. Weidner</td>
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<tr>
<td>20265/66</td>
<td>Remote Sensing Methods</td>
<td>2/1</td>
<td>S</td>
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<td>20267</td>
<td>Hauptvermessungsübung III</td>
<td>0/1</td>
<td>S</td>
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<td>S. Hinz, Weidner</td>
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<td>19055</td>
<td>Hydraulic Engineering and Water</td>
<td>2/1</td>
<td>W</td>
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<td>F. Nestmann</td>
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<td>2600101</td>
<td>Geological Hazards and Risks</td>
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<td>W</td>
<td>4</td>
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<td>19061</td>
<td>Hydrology</td>
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<td>W</td>
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<td>20712/13</td>
<td>Introduction to GIS for students of natural,</td>
<td>2/2</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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.
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”.

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].

Learning Outcomes
See German version.

Content
See German version.

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

Remarks
The LV 2600101/102 Geological Hazards and Risks is not offered in WS 2013/14.
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.

Coordination: M. Kunz
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

ECTS Credits: 9
Cycle: Every term
Duration: 1

Courses in module

<table>
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<tr>
<th>ID</th>
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<td>57535</td>
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<td>S</td>
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<td>3/2/1</td>
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<td>20241/42</td>
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<td>S</td>
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<td>20265/66</td>
<td>Remote Sensing Methods</td>
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<td>S</td>
<td>3</td>
<td>S. Hinz, U. Weidner</td>
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<td>20267</td>
<td>Hauptvermessungsübung III</td>
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<td>19055</td>
<td>Hydraulic Engineering and Water</td>
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<td>2600101</td>
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<td>W</td>
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<tr>
<td>19061</td>
<td>Hydrology</td>
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<td>W</td>
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<td>20712/13</td>
<td>Introduction to GIS for students of natural,</td>
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<td>W</td>
<td>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 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 engineering modules of the core programm. For exceptions see § 17 Abs. 6 SPO.
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”.

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].

Learning Outcomes
See German version.

Content
See German version.

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

Remarks
The LV 2600101/102 Geological Hazards and Risks is not offered in WS 2013/14.
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.
Module: Extracurricular Module in Engineering [WI3INGAPL]

Coordination: Prüfer einer Ingenieurwissenschaftlichen Fakultät
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Engineering Science

<table>
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<tr>
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<th>Duration</th>
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<tbody>
<tr>
<td>9</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.

Learning Outcomes
See German version.

Content

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

Module: Statistical Applications of Financial Risk Management [WI3STAT]

Coordination: W. Heller
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Statistics

<table>
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Courses in module

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<th>Term</th>
<th>CP</th>
<th>Responsible Lecturer(s)</th>
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<tr>
<td>2521325/2521326</td>
<td>Statistics and Econometrics in Business and Economics</td>
<td>2/2</td>
<td>W</td>
<td>4,5</td>
<td>W. Heller</td>
</tr>
<tr>
<td>2520375</td>
<td>Data Mining</td>
<td>2</td>
<td>W/S</td>
<td>5</td>
<td>G. Nakhaeizadeh</td>
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<tr>
<td>2520016/2520017</td>
<td>Economics III: Introduction in Econometrics</td>
<td>2/2</td>
<td>S</td>
<td>5</td>
<td>N.N.</td>
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Learning Control / Examinations
The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.

The 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 module Statistics [WI1STAT]. For exceptions see § 17 Abs. 6 SPO.
The lecture Statistics and Econometrics in Business and Economics has to be taken.

Learning Outcomes
See German version.

Content

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

## Module: Elective Module Law [WI3JURA]

<table>
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<tr>
<th>ID</th>
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<tr>
<td>24012</td>
<td>Civil Law for Beginners</td>
<td>4/0</td>
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<td>T. Dreier, O. Knöfel</td>
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<tr>
<td>24016</td>
<td>Public Law I - Basic Principles</td>
<td>2/0</td>
<td>W</td>
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<td>24520</td>
<td>Public Law II - Public Economic Law</td>
<td>2/0</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.

### Learning Outcomes

See German version.

### Content

### Workload

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

**Module: Sociology/Empirical Social Research [WI3SOZ]**

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#### Courses in module

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<td>Social structures of modern societies</td>
<td>2 W</td>
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<td>spezSoz</td>
<td>Special Sociology</td>
<td>2 W/S</td>
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<td>SozSem</td>
<td>Projectseminar</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 for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

**Conditions**

None.

**Recommendations**

Knowledge of Statistics 1 and Statistics 2 is required.

**Learning Outcomes**

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.

**Workload**

The total workload for this module is approximately 270 hours. For further information see German version.
Module: Qualitative Social Research [WI3SOZ2]

Coordination: M. Pfadenhauer
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: Sociology

ECTS Credits: 9
Cycle: 2
Duration: 2

Courses in module

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<td>5011015 spezSoz</td>
<td>Interpretative Social Research Methods Special Sociology</td>
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<td>n.n.</td>
<td>Explorative-interpretative Project Seminar</td>
<td>2/0 W/S</td>
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<td>G. Nollmann, Pfadenhauer, Haupt, Grenz, Eisewicht, Kunz, Dukat, Albrecht, Enderle, M. Pfadenhauer, Kunz, Grenz, Eisewicht, Dukat, Enderle, Albrecht</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
None.

Recommendations
It is recommended to attend the lecture on interpretative methods of social research before attending the project.

Learning Outcomes
The student
- possesses a basic overview of the well-established and some of the advanced explorative methods of data collection and interpretative methods of data evaluation,
- can address basic sociological questions to subjects of different types,
- and is capable of choosing and applying appropriate explorative-interpretative methods according to a research question.

Content
Qualitative Social Research is of major importance not only in (Social) Sciences but also in applied economic contexts. Within the framework of this module the student gets taught basic and advanced methods of non-standardised data collection, fixation and evaluation. Accordingly the module consists of three courses:
- the lecture ‘Interpretative Social Research Methods’ which ends with a written exam (4 LP).
- a course ‘Special Sociology’ of choice in which 2 or 4 credits have to be obtained (6 credits needed in course and project course combined).
- a project course focusing on explorative-interpretative methods in which 2 or 4 credits have to be obtained (6 credits needed in course and project course combined).

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

Module: Seminar Module [WI3SEM]

Coordination: Studiendekan (Fak. f. Wirtschaftswissenschaften)
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject: ECTS Credits Cycle Duration

<table>
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<td>SemAIFB1</td>
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<td>R. Studer, A. Oberweis, T. Wolf, R. Kneuper</td>
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<td>SemAIFB2</td>
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<td>SemAIFB3</td>
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<td>SemAIFB5</td>
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<td>2530280</td>
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<td>SemETU1</td>
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<td>SemWIOR3</td>
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<td>Seminar in Behavioral and Experimental Economics</td>
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<td>Selected Topics in Public Management and Governance</td>
<td>2 W</td>
<td>3</td>
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<td>SemETS3</td>
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<td>3</td>
<td>M. Hillebrand</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 single 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].

Learning Outcomes

The student

- investigates with a selected topic in a special subject,
- analyses and discusses topical issues in the course and within the final term paper,
- discusses, presents and defends subject-specific arguments within the given topic,
- plans and realizes the final term paper mostly autonomous.

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: http://www.wiwi.kit.edu/2361.php.
### Module: Internship [WI3EXPRAK]

**Coordination:** Der Vorsitzende des Prüfungsausschusses  
**Degree programme:** Wirtschaftsingenieurwesen (B.Sc.)  

<table>
<thead>
<tr>
<th>Subject</th>
<th>ECTS Credits</th>
<th>Cycle</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
<td></td>
<td></td>
</tr>
</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 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.

#### Learning Outcomes

**Students**

- engage in practical aspects of Industrial Engineering and Management and get to know the professional requirements,
- gain a general insight into the operations of a company,
- identify companies complexity and developing knowledge and skills, which facilitate the understanding of operational sequences,
- train key qualifications such as personal initiative (already in the application), team skills and the ability to integrate into occupational hierarchie.

#### 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.
Module: Bachelor Thesis [WI3THESIS]

Coordination: Der Vorsitzende des Prüfungsausschusses
Degree programme: Wirtschaftsingenieurwesen (B.Sc.)
Subject:

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 one 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 core program (according to § 17 paragraph 2 examination regulation) 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.

Learning Outcomes
See German version.

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.
Anhang: Qualifikationsziele Wirtschaftsingenieurwesen (B.Sc.)

Die Absolvent/innen des Bachelorstudiengangs Wirtschaftsingenieurwesen verfügen über ein im dreisemestrigen Kernprogramm erworbenes methodisch ausgerichtetes wirtschaftswissenschaftliches, ingenieurwissenschaftliches, mathematisches und technologisches Grundlagenwissen.

Der wirtschaftswissenschaftliche Bereich umfasst betriebswirtschaftliche Fragestellungen der Finanzwirtschaft, der Unternehmensführung, der Informationswirtschaft, der Produktionswirtschaft, des Marketings und des Rechnungswesens sowie volkswirtschaftliche Zusammenhänge der Mikroökonomie und Makroökonomie.


Im ingenieurwissenschaftlichen Bereich liegen die Schwerpunkte auf Material- und Energiebilanzen, in der Werkstoffcharakterisierung und -entwicklung, in der technischen Mechanik sowie in der Elektrotechnik. Der technologische Bereich wird durch die Angewandte und Theoretische Informatik abgedeckt.


Sie besitzen die Fähigkeit, das erworbbene Wissen berufsfeldbezogen in der Industrie, im Dienstleitungssektor oder in der öffentlichen Verwaltung anzuwenden sowie das Masterstudium Wirtschaftsingenieurwesen oder ein verwandtes Studium aufzunehmen.

Industrial Engineering and Management (B.Sc.)
Module Handbook, Date: 21.08.2014
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 gleichermäßen.

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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 erworbene Wissen berufsbezogen 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.
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 Moduleinzelprüfungsnoten 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 in begründeten Ausnahmenfall auch kurzfristig die Änderung der Prüfungsf orm 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 vorgeschriebenen 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 Einzelpfungen abzu-
nehmen 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.

Die wesentlichen Gegenstände und Ergebnisse der mündlichen Prüfung in den einzelnen
Fächern sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist dem Studierenden im
Anschluss an die mündliche Prüfung bekannt zu geben.

Studierende, die sich in einem späteren Prüfungszeitraum der gleichen Prüfung unterziehen
wollen, werden entsprechend den räumlichen Verhältnissen als Zuhörer bei mündlichen Prüfun-
gen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prü-
fungsergebnisse. Aus wichtigen Gründen oder auf Antrag des Studierenden ist die Zulassung zu
versagen.

Für Erfolgskontrollen anderer Art sind angemessene Bearbeitungsfristen einzuräumen und
Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprech-
ende 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 Bei-
sitzer 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 fest-
gesetzt.

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 eingezeichnet 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:

<table>
<thead>
<tr>
<th>Note</th>
<th>Ergebnis</th>
</tr>
</thead>
<tbody>
<tr>
<td>bis 1,5</td>
<td>sehr gut</td>
</tr>
<tr>
<td>1.6 bis 2.5</td>
<td>gut</td>
</tr>
<tr>
<td>2.6 bis 3.5</td>
<td>befriedigend</td>
</tr>
<tr>
<td>3.6 bis 4.0</td>
<td>ausreichend</td>
</tr>
</tbody>
</table>
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 Hinderungsgrundes 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.

(2) Maximal zwei Zusatzmodule mit jeweils mindestens neun Leistungspunkten werden auf Antrag des Studierenden in das Bachelorzeugnis aufgenommen und entsprechend gekennzeichnet.

Zusatzmodule müssen nicht im Studienplan oder Modulhandbuch definiert sein. Im Zweifelsfall entscheidet der Prüfungsausschuss.


(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 Prüfungsssekretariat 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 Prüfungsbefugnis 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 Prüfungsbefugnis 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 Fachvertreter 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 (Doppelmodul) 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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